AN EVALUATION OF COMPETITIVENESS OF SOUTH AFRICAN SUGAR EXPORTS

By

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Submitted in accordance with the requirements for the degree of

MASTER OF SCIENCE IN AGRICULTURE

in the

Department of Agriculture and Animal Health

UNIVERSITY OF SOUTH AFRICA

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FEBRUARY 2019

DECLARATION

I BUBELE NOYAKAZA hereby make a declaration that "**AN EVALUATION OF COMPETITIVENESS OF SOUTH AFRICAN SUGAR EXPORTS**" is my work and is original. All the sources that I have used in this dissertation were cited accordingly. I confirm that this dissertation has not been submitted at any other university.

Signed: _____

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Date: February 2019

ACKNOWLEDGEMENTS

I would like to begin by thanking the Lord Almighty for giving me strength, hope and wisdom to complete this study, as this would not have been possible without Him.

I would also like to send a special thanks to Prof M.A Antwi for his productive contribution, support, guidance, patience and inspiration that saw this work a success. If it wasn't for him giving me hope and support to carry on when things seemed impossible this study wouldn't have got where it got. It was a great pleasure to work under your supervision. I appreciate your time and effort that you spent in making sure that this study is a success.

I am grateful to my family, who pushed me hard to register my Masters and constantly checked up on me to see how my studies were going. You kept on giving me hope and when I had little hope on my studies since my undergraduate studies. I would like to dedicate this qualification to my mother Ntomboxolo Noyakaza Tsengiwe, I thank her a lot for always believing in me.

I would also like to thank my colleagues Mr Simeon Maake, Dr Aluwani Tagwi, Ms Nontobeko Silekwa, Ms Phathu Shilowa and Ms Danisile Mthombeni as you always encouraged me to push my studies, you gave me great pressure whenever I met one of you, you would always ask me about my studies and that gave me more strength to work on my studies.

ABSTRACT

The purpose of this paper was to examine the competitiveness of the South African sugar industry relative to the top ten exporters of the product, namely Brazil, Thailand, Netherlands, Mexico, China, Germany, Canada, France, Belgium and the United States of America. Different techniques were used in the study to ensure that the main objective of the study was achieved. Three popular indices, namely the Balassa Revealed Comparative Advantage (RCA#) Index, the Net Export Index (NX_i) and the Relative Revealed Comparative Trade Advantage (RTA) Index were used to compare the competitiveness of the top ten sugar exporting countries including South Africa. The Trade Potential Index was also applied in the study to investigate markets that South Africa could use to increase its exports. Time series data collected on the trade map and the Food and Agricultural Organization of the United Nations were used for the analysis of the markets by using an Excel spreadsheet. The results of the study showed that South Africa has a trade competitive advantage against the majority of the countries considered. South Africa's competitive performance was surpassed by that of Brazil, which was the strongest trader of sugar, followed by Thailand and China. The remaining seven countries (Mexico, Belgium, Netherlands, Canada, Germany, USA and China) were all exceeded by the South African sugar industry. The top potential markets that South Africa could exploit to increase its exports were identified with the use of the Trade Potential Index (TPI). The countries that were identified were selected by calculating the scores, comparing tariffs imposed by these markets to the exporters of sugar and looking at the concentration of the markets that supply these potential markets. The United States of America, Lesotho, Democratic Republic of Congo, Malawi and Egypt were identified as the top five countries that South Africa could exploit for its sugar exports. South Africa has trade agreements with the majority of these countries which assist the country in obtaining preferential agreements when exporting its products to these countries. Recommendations were made that could help the sugar industry to grow its competitiveness.

SICAPHUNO

Inhloso yaleliphepha bekukuhlola kuncintisana kwemboni yashukela yaseNingizimu Afrika nayicatsaniswa nebatfumeli ngaphandle labasembili labalishumi balomkhicito, lekuyiBrazil, iThailand, iNetherlands, iMexico, iChina, iGermany, iCanada, iFrance, iBelgium ne-United States of America. Kusetjentiswa emasu lahlukene kulesifundvo kucinisekisa kutsi inhloso lenkhulu yesifundvo iyaphunyelelwa. Kusetjentiswe ema-indice, lekuyi-Balassa Revealed Comparative Advantage (RCA#) Index, i-Net Export Index (NXi) kanye ne-Relative Revealed Comparative Trade Advantage (RTA) Index kucatsanisa kuncintisana kwalamave lasembili lalishumi lakhicita shukela kufaka ekhatsi eNingizimu Afrika. I-Trade Potential Index nayo isetjentisiwe kulesifundvo kuphenya timakethe letingasetjentiswa yiNingizimu Afrika kute ikhulise kutfumela ngaphandle kwayo lomkhicito washukela. Idatha yeluchungechunge lwesikhatsi legcogcwe kulibalave lekuhwebelana kanye naseNhlanganweni Yekudla Neyetekulima yaMhlab'uhlangene isetjentisiswe kuloluhlatiyo lwetimakethe ngekusebentisa si-spreadsheet se-Excel. Imiphumela yesifundvo ikhombise kwekutsi iNingizimu Afrika inekusitakala ngekuncintisana ekuhwebeni nayicatsaniswa nelinyenti lalamave lamanyenti lahlatiyiwe. Kusebenta kwekuncintisana kweNingizimu Afrika kundlulwe kusebenta kweBrazil, lebeyingumhwebi lomkhulu washukela, ilandzelwe yiThailand kanye neChina. Lamave lasikhombisa lasele (iMexico, iBelgium, iNetherlands, iCanada, iGermany, i-USA neFrance) onkhe andlulwe yimboni yashukela yaseNingizimu Afrika. Timakethe letingaba khona letiphambili leti iNingizimu Afrika ingatisebentisa kukhulisa kutfumela ngaphandle kwayo tibonwe ngekusebentisa iTrade Potential Index (TPI). Emave laboniwe akhetfwe ngekubala imiphumela, kucatsanisa ematharifu lafakwe nguletimakethe kubatfumeli bangaphandle bashukela nekubuka kulokucocana kwetimakethe lephakela letimakethe letingaba khona. I-United States of America, iLesotho, iDemocratic Republic of Congo, iMalawi ne-Egypt abonwe njengemave lasembili lasihlanu langasetjentiswa yiNingizimu Afrika kutfola ngaphandle shukela wayo. INingizimu Afrika inetivumelwano tekuhwebelana nelinyenti lalamave lokusita lelive ekutfoleni tivumelwano tekubekwa ngembili nangabe kutfunyelwa ngaphandle imikhicito yayo kulamave. Tiphakamiso letingasita imboni yashukela kukhulisa kuncintisana kwayo tentiwe.

KAFUSHANE NGOCWANINGO

Inhloso yalo mbhalo wocwaningo kwabe kuwukucubungula nokuhlaziya amandla okuncintisana ngempumelelo kwemboni kashukela yaseNingizimu Afrika uma iqhathaniswa namazwe ayishumi ahamba phambili emhlabeni ekuthumeleni imikhiqizo kashukela emazweni angaphandle, okuyi-Brazil, Thailand, Netherlands, Mexico, China, Germany, Canada, France, Belgium kanye neMelika (USA). Kulolu cwaningo kwasetshenziswa izindlela ezihlukahlukene ngenhloso yokuqinisekisa ukufezekiswa kwenjongo enkulu yocwaningo. Kwasetshenziswa izinkomba-simo ezintathu ezidumile futhi okuyizona ezisetshenziswa kakhulu, okuyi-*Balassa Revealed Comparative Advantage (RCA#) Index, Net Export Index (NX_i)* kanye ne-*Relative Revealed Comparative Trade Advantage (RTA) Index* ukuqhathanisa amandla okuncintisana ngempumelelo kwamazwe ayishumi ahamba phambili emhlabeni ekuthumeleni ushukela emazweni angaphandle, kubandakanya neNingizimu Afrika. I-*Trade Potential Index* yasetshenziswa futhi nayo kulolu cwaningo ukuphenya nokucubungula izimakethe ezingasetshenziswa yiNingizimu Afrika ukukhulisa inani lemikhiqizo yayo ethunyelwa emazweni angaphandle. Idatha eqoqwe ochungechungeni lwamaqophelo alandelana ngokwesikhathi ebalazweni lokuhwebelana kanye naseNhlanganweni Yokudla Nezolimo yeNhlangano Yezizwe yasetshenziselwa ukuhlaziya izimakethe ku-*Excel spreadsheet*. Imiphumela yocwaningo yabonisa ukuthi iNingizimu Afrika isesimweni esikahle futhi inamandla angcono okuncintisana ngempumelelo kwezohwebo uma iqhathaniswa neningi lamazwe acutshungulwayo. Amandla eNingizimu Afrika okuncintisana ngempumelelo adlulwa yilawo e-Brazil, okuyizwe elinamandla kakhulu futhi elihamba phambili kwezokuhwebelana ngoshukela, kulandele i-Thailand kanye ne-France. Imboni kashukela yaseNingizimu Afrika inamandla angaphezulu kwawo wonke lawa amanye amazwe asele ayisikhombisa (okuyi-Mexico, Belgium, Netherlands, Canada, Germany, USA kanye ne-China). Amazwe ahamba phambili angasetshenziswa yiNingizimu Afrika ekukhuphuleni umthamo wemikhiqizo yayo ethunyelwa emazweni angaphandle ahlonzwa ngokusebenzisa i-*Trade Potential Index* (TPI). Lawo mazwe ahlonziwe

akhethwe ngokubala inani lamaphuzu, ukuqhathanisa intela yempahla ekhokhiswa yilawo mazwe emazweni angaphandle athumela ushukela kanye nokubheka ubuningi bamazwe athumela imikhiqizo yawo kulawo mazwe angasetshenziswa yiNingizimu Afrika ukukhulisa umthamo wemikhiqizo yawo ethunyelwa emazweni angaphandle. I-USA, Lesotho, Democratic Republic of Congo, Malawi kanye ne-Egypt ahlonzwa njengamazwe aphuma phambili iNingizimu Afrika engathumela kuwona ushukela. INingizimu Afrika inezivumelwano zokuhwebelana neningi lalawa mazwe, okuyizivumelwano eziyilekelelayo ekutholeni izivumelwano ezizokwenza ibhekelelwe kangcono futhi icatshangelwe uma ithumela imikhiqizo yayo kulawa mazwe angaphandle. Kwenziwa izincomo ezingayilekelela imboni kashukela ukuthi ikwazi ukukhulisa amandla ayo okuncintisana ngempumelelo.

KEY WORDS:

Sugar exports competitiveness, Revealed Comparative Advantage index, Net Export index, Relative Revealed Comparative Trade Advantage index, Trade Potential Index.

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CEP	Comparative Export Performance
CMS	Constant Market Share
DAFF	Department of Agriculture, Forestry and Fisheries
EU	European Union
FAO	Food and Agriculture Organisation
GAT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
ITC	International Trade Centre
NX_i	Net Export index
OECD	Organisation for Economic Co-operation and Development
PAM	Policy Analysis Matrix
RCA	Revealed Comparative Advantage
RCR	Resource Cost Ratio
REA	Relative Export Advantage
RMA	Relative Import Advantage
RTA	Revealed Comparative Trade Advantage
RXA	Relative Export Advantage
SACU	Southern African Customs Union
SADC	Southern African Development Community
SASRI	Southern African Sugar Cane Research Institute
SWOT	Strengths, Weaknesses, Threats and Opportunities

TPI	Trade Performance Index
UK	United Kingdom
USA	United States of America
US$	United States of America Dollar

CHAPTER 1: INTRODUCTION

The purpose of this chapter is to provide a background of agriculture and mostly that of sugar industry. The chapter also covered the problem statement, aims and objectives, hypothesis, research questions, and the significance of the study.

1.1 Background

Agriculture is a significant sector in majority of developing countries and most of the rural inhabitants depend on it (Stienen *et al*., 2007). Agriculture has always been treated in a different way from other sectors within the General Agreement on Tariffs and Trade (GATT) rules. In the beginning of the GATT, the agricultural sector was given exceptional treatment as a result of the political reality in numerous developed countries, which demanded that support be given to agriculture (Marks and Maskus, 1993). The agricultural sector is known to be amongst the most vital sectors globally through its support to the economic welfare of different countries. Numerous agricultural commodities are known to interest a huge portion of public attention and sugar is amongst these commodities. There are more than 100 countries that produce sugar worldwide. Above 70% of the sugar produced globally is consumed domestically and the surplus is traded around the world. Most of the sugar traded worldwide is traded under bilateral long term or preferential trade agreements between trading countries. Since only minor quantities of world production is traded freely, small variations in production and government policies tend to have large influences on world sugar markets. Due to this influence, sugar prices have been unbalanced in the world market (Taylor, 2017).

Sugar is treated as a very sensitive product between countries when trading. The South African sugar industry is cost-competitive, and always appears amongst the top 15 out of about 120 sugar-producing countries globally. The sugar industry dominates in three provinces in South Africa, namely; Mpumalanga and KwaZulu-Natal and to a lesser extent in Eastern Cape, where the industry contributes, a progressive change to the lives of many South African inhabitants, and encouraging economic growth and development (South African Sugarcane Research Institute, 2015).

The South African sugar industry contributes a large share to the GDP of the country through high employment creation, foreign exchange earnings, partnerships with major suppliers, support industries and consumers. The industry is accountable for generating direct annual income of approximately R6 billion on exports that are supplied to the Southern African Customs Union (SACU) regional block and the rest of the world. On an annual basis the sugar Industry is responsible for generating an estimated R2 billion of foreign exchange earnings (South African Sugarcane Research Institute, 2015).

Improved exports of the agricultural sector, particularly those of high value agricultural products and value-added commodities, are popular of delivering development for the agricultural sector in South Africa (Kirsten, 1999).

The main boosters of South African excellence are the exceptional export infrastructure, efficient industry organization and world-renowned agricultural and industrial research platforms. The sugar industry in South Africa produces efficiently but because of subsidies in other countries, it encourages overproduction in some of the major sugar-producing countries, which makes the South African industry to struggle at times to export

profitably to the world market. The sugar industry is still amongst the most biased markets worldwide and will not change in the absence of multilateral reform and liberalization (South African Sugarcane Research Institute, 2015). This paper reviews the competitive performance of South African sugar industry in comparison with the top 10 sugar exporters worldwide.

1.2 Problem statement

Globalization of economies of countries has resulted in numerous new challenges to agriculture around the globe. Agriculture needs to come up with strategies that motivate new consumers in new markets to buy its products and attract investors for the sector to compete in new and foreign markets and not only domestically (Kirsten, 1999). The subject of competitiveness has become essential for agricultural industries, as these industries cannot maintain their financial relevance and growth without producing and marketing competitive products and services (O'Rourke, 2011).

The South African sugar industry contributes an average of R2 billion to the country's foreign exchange earnings on a yearly basis (Department of Agriculture, Forestry and Fisheries, 2014). The sugar-producing sub-sector has experienced several challenges due to the fast variations in environmental legislation in the past decade. The population growth around some of the agricultural industries puts pressure on sugar industry in South Africa (Padayachee, 2010).

Several authors on certain products that are traded by South Africa have conducted different studies and results have been discussed. However, there have been no studies,

which show the competitive status of the South African sugar industry globally. It is essential to consider whether the South African sugar industry has potential to compete with other countries. Therefore, this study focused on the competitiveness status of the South African sugar industry and seek to identify marketing channels that could be used to increase the exports of the product.

1.3 Research questions

The study focused on the following research questions:

The main research question of the study was *"what is the position of the South African sugar industry's competitive status relative to the top ten sugar exporting countries"?*

1.3.1 Other research questions

- Is the South African Sugar industry competing sufficiently within the intercountry?
- What are the possible strategies that could be adopted to improve the performance of the South African Sugar industry?

1.4 The significance of the study

The study developed an understanding of the South African sugar industry status and recommended new potential marketing channels that the country could utilize to boost its economic welfare. The South African sugar farmers may not be aware of these potential markets that could be exploited for the growth of sugar exports; hence, this study would assist exporters in exploring other potential markets that could be accessed. Conclusions and recommendations from the study would also serve as the basis for informed policy decisions by the South African government to improve the sugar industry.

1.5 Aims and objectives of the study

The overall aim of the study was to evaluate and compare the South African sugar market competitiveness against other countries, with a view of investigating supplementary strategies, which could be adopted to improve the performance of the sugar industry.

1.5.1 Specific objectives

The specific objectives of the study were:

- To define competitive performance in the South African sugar industry;
- To measure the competitiveness of the South African sugar industry;
- To explore marketing channels that could boost the South African sugar exports; and
- To identify possible strategies that could promote the level of competitiveness of the sugar industry.

1.6 Hypothesis

The following hypothesis was formulated to ensure that the research question was answered:

- The South Africa sugar industry is not competitive against its major rival countries.

1.7 Outline of the dissertation

The dissertation is divided into six chapters as highlighted below:

- **Chapter One**: provides the introduction, problem statement, research questions, hypothesis, research aim, objectives, and the significance of the study.
- **Chapter Two**: gives a clear review of literature on the competitiveness of sugar industry with indices that have been utilized previously by different authors when reviewing trade competitiveness of certain industries.
- **Chapter Three**: provides the overview of intercountry of sugar production trends and trade. It also highlights all the major exporters and the position of South Africa amongst the exporters of sugar globally.
- **Chapter Four**: presents the approach to the study, highlighting all steps and instruments that were used.
- **Chapter Five**: is the full analysis of results, all objectives were answered and the comparison between the top ten countries was carried out.
- **Chapter Six**: provides the summary, conclusion and recommendations of the study.

1.8 Conceptual framework of the research

This study made use of three components of conceptual framework, by simultaneously applying numerous indices directly calculated from foreign trade data to provide an understandable explicatory of a country's comparative advantages. This was necessary because it was difficult to explain the competitiveness of a country with the use of a single index, since each of the traditional indices has its own advantages and disadvantages (Gnidchenko and Salnikov, 2015).

The indices utilized in the study were discussed briefly. First, this study adopts a new and developed model of Balassa's Revealed Comparative advantage (RCA), also called the Vollrath (1991) index (denoted as RCA# to separate it from the initial RCA) to analyze the competitiveness of the sugar industry.

The Balassa's Revealed Comparative Advantage (RCA), was a commonly used measure of comparative advantage until it was challenged by different economists after observing loopholes in the index. Hoen and Oosterhaven (2006) showed that the standard measure of RCA, ranging from 0 to ∞, has challenging properties. As a result, of the multiplicative specifications, it has a moving mean larger than its expected value of 1, while its distribution strongly depends on the number of countries and industries. The authors argued that the properties caused the outcomes to be incomparable across time and place and its economic interpretation problematic and therefore, proposed a substitute measure.

Vollrath (1991) believed that the RCA should be articulated as the ratio of the anticipated-real trade and it should not be concentrated on a single product. Whereas Hinloopen and Van Marrewijk (2001) and Hoen and Oosterhaven, (2006) all agreed that the RCA should have a constant distribution, so that one should be able to compare its values over time, industries and countries. RCA should reflect net trade rather than exports only (Leamer, 1984; Balance et al., 1987).

Due to the above reasons the Vollrath (1991) RCA# was deliberated to be the most relevant measure of competitiveness for the study since a collection of countries was estimated to have a huge influence at intercountry level than a single economy. The index

considered the importance of the country's exports in a specific sector and at intercountry level, and it eradicated any double calculation difficulties in the world trade.

Second, the Net Export index (NXi index) was also adopted in the study. Vollrath (1991) and Balassa (1989) recommended that the Net Export Index could be used as substitute measures of competitiveness and comparative advantage keeping differentiated products, intra-industry trade, and flows of exports and imports in mind. The NXi index did not consider the whole level of trade in a specific product. That means that a country that could produce efficiently, with a slight portion of exports and no imports, would have an index of 100 and hence, seemed to be extremely competitive, whereas it hardly trades at all. It was for these reasons that, Galetto (2003) suggested that the NXi and the RCA should be utilized together in evaluating and investigating the competitiveness of an industry or product. Hence, the study adopted all three indices to examine the competitiveness of the South African sugar industry in relation to the top ten global sugar exporters.

Third, the study also made use of the relative Revealed Comparative Trade Advantage (RTA) index to determine the competitive advantage of the sugar industries. The RTA index explained the country's portion of the world market relative to one product in relation to its portion of all traded goods; and it reports for imports as well as exports and for this reason the index is taken to be the most applicable measure of trade competitive advantage. It indirectly weighs the competitive advantage by calculating the significance of relative export and import competitive advantages. This has become more vital due to the growth in intra-industry trade (Frohberg and Hartmann, 1997).

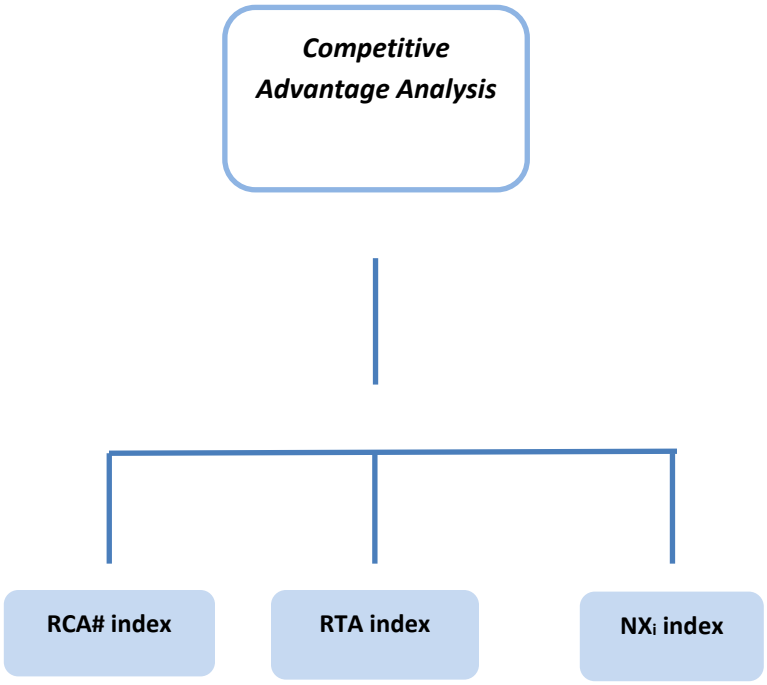

Figure 1.1: A conceptual framework of the research

Fourth, the Trade Potential Index utilizes a scoring structure built on data acquired from the Trade Map database to determine which countries or commodities have the potential to be exploited for exports. The trade indicators enclosed in the database used were: *"did SA export to the country, is the export by SA to the country growing, is SA export to the world growing, is the country's imports from the world growing, concentration of markets in that country and tariffs imposed by the country to SA".* The TPI focused on commodities or countries that have already traded together. The TPI is measured against a potential score of 4 since the indicative potential trade larger than R1 million is not available for the product examined. A total of 0 would characterize the lowest end of the scale and the least trade potential whilst a score of 4 indicates the highest trade probability (DAFF, 2014).

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide a brief outlook of the contribution of agriculture to the South African GDP and to clarify between comparative advantage and competitive advantage, which are major terms in the trade theory. The chapter also reviews different agricultural trade studies that have been conducted by certain authors using different economic indexes.

2.2 The contribution of agriculture to the gross domestic product of South Africa

In 2015 fruits and nuts were recorded as the most significant export basket in the agricultural, forestry and fisheries sub-sector. Paper and paper products increased by 94%, which was the highest progress in the export of products. South Africa remains a net exporter of agricultural, forestry and fisheries products in primary agricultural products, and it is still a net importer of processed agricultural products (DAFF, 2016).

Agriculture, forestry and fisheries sectors had the slowest growth compared with most of the other sectors in recent years, causing a decline in the industry's share of the GDP from higher than 6% in the 1970s to 2.0% in 2015.

Regardless of its minor share of the total GDP, primary agriculture is a significant sector in the South African economy. Agriculture is still an important generator of employment, particularly in the rural areas, and a major foreign exchange earner. The agricultural sector utilizes approximately 70% of its productivity as intermediate products. It is clear

that the agricultural sector is a very crucial engine of the economic development for the rest of the economy (DAFF, 2016/2017).

The agricultural sector contributed about 2.5% to GDP of South Africa in 2016, which was still below the capability of the sector. It further contributed about 12% to the GDP from manufacturing and processing in value chain adding (DAFF, 2016). South Africa recorded an increase of 12% in 2017 on agricultural exports to Asia, a decline of 3% and 1% on exports to other Africa countries and Europe, respectively. Imports from African countries and Europe remain comparatively the same while imports from America decreased by 33% compared to 2016 (Ntombela, 2017).

The gross income of producers improved by 10.2% between 2016 and 2017. The gross income amounted to R267 009 million compared to R242 216 million in 2016. The increase was as a result of higher production of maize, grain sorghum, groundnuts, soya beans and dry beans in 2017 compared to poor yield 2016, due to severe drought (DAFF, 2017).

In 2018, the South African GDP from agriculture declined from R 76 566.90 million in the first quarter of 2018 to R70 244.51 million in the second quarter of 2018. On average, the GDP from the agricultural sector was R59 144.96 million between 1993 to 2018, reaching an all-time high of R84 820.92 million in the year of 2017 and a record low of R33 530.55 million in the first quarter of 1993 (Trading Economics, 2018).

The GDP diminished by 0.7% in the second quarter of 2018 following a reduction of 2. 6% in the first quarter. Agriculture, transport and trade were the leading negative contributors to the GDP in the second quarter of 2018. The agriculture, forestry and fishing industry had a decline of 29. 2% and a negative impact of -0.8 points to the GDP. The key positive contributions to the GDP were derived from the mining industry, finance, real estate and business services (Statistics SA, 2018).

Figure 2.1 below shows the contribution of different sectors to the GDP in the second quarter of 2018. The agricultural sector was the worst performer in terms of its contribution to the economy with a negative value of -0.8 than any other sector. The poor performance in the sector was due to unfavourable climatic conditions. Mining and finance were the only two sectors that showed very strong contributions, followed by construction. The remaining sectors with no values shown on the graph contributed 0% to the GDP in the second quarter of 2018.

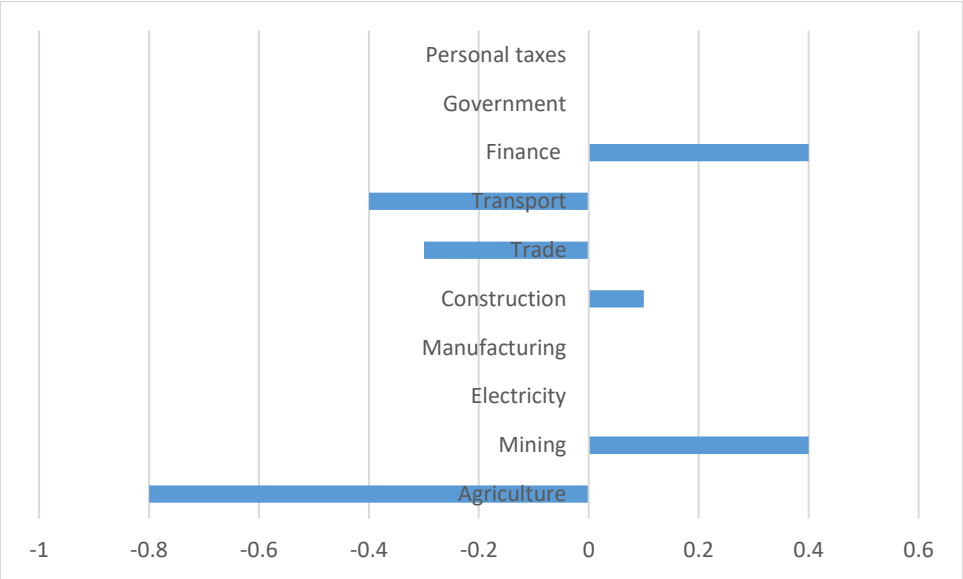

Figure 2.1: Performance of South African industries in the second quarter of 2018

Source: Statistics South Africa, 2018.

2.3 A brief clarification of comparative and competitive advantage

Comparative advantage and competitive advantage are important concepts dominant to the economic theory. In order to comprehend the vitality of intercountry trade in agriculture and highlight the significant attributes accountable for the existing trade patterns, it is important to understand these two terms (Msoma, 2004). The two concepts will be used in the study for analysis and extrapolation of data in the next chapters.

According to Nordin *et al.* (2008) and Lim (1997), the theory of competitiveness is constructed on comparative and competitive advantage, both of which are connected, but the terms are frequently used interchangeably. The Organization for Economic Co-operation and Development (OECD) (2010) further expanded that competitiveness is a relative measure and there is no consensus on how to describe it, or how to measure it accurately. Comparative advantage measures how resources are competently allocated at the country level, and competitiveness measures the efficiency of commercial actions of single producers and in the world markets (Kannapiran and Fleming, 1999).

Esterhuizen et al. (2008), explained competitiveness as when a sector, firm or industry can compete effectively with other markets with the aim of obtaining a stable development within the intercountry environment while receiving the opportunity cost returns on resources used. OECD (2004), also explained competitiveness as the extent to which a country can produce commodities and facilities to achieve the test of the world market,

while concurrently sustaining and extending the real incomes of its people over the long term under free trade and fair market conditions.

The principle of comparative advantage has been amongst the most recognized encouragements on economic strategy creation and global trade in recent history. Warr (1994) argued that for a country to be considered as having a comparative advantage more than the other, it must be producing a good or service at a lower cost than the other country in question in terms of the quantities given-up that could have been produced.

Serin and Civan (2008) defined comparative advantage as a phrase used to portray the tendencies of a country to export products that they are competent in producing relative to the entire world. That means that, if a country can produce a commodity at a lower opportunity cost than other countries, then with trade, that country should specialize in the manufacture of that specific good. Then that country can receive other goods at lower prices through trade of the goods in which it produces at a lower opportunity cost.

The concept of comparative advantage has been fundamental to the trade philosophy, representing the gains from, and the trends of trade. If a country concentrated specifically in the production and exportation of commodities in which other countries produced at higher costs, then the global well-being and welfare of each country would be maximized (Kannapiran and Fleming, 1999). Competitiveness can be ascribed to a single commodity or facility, enterprise, industry, economic sector, region, country or worldwide economic blocs. However, the efforts of forming a single popular definition of competitiveness appear to be headed for failure (Siudek and Zawojska, 2014). Sharples and Milham (1990) described being competitive as being able to supply goods and services to

purchasers immediately, at a place and form that is required by these consumers at prices similar or lower than those of the competitors whilst opportunity cost returns are received on inputs used.

Barney (1991) defined competitive advantage as when a company is performing a value-generating commodity not being implemented by other potential competitors at that specific period. Competitiveness is the capability of producing goods and facilities that meet the standards of global sectors competitively. This means that the term refers to being able to manufacture and supply commodities and services of high quality at lower prices than domestic and global rivals do.

Competitiveness is a company's long-run revenue accomplishment and its capacity to reimburse its workers and deliver greater profits to its owners (Buckley *et al.,* 1988). These definitions prove that no consensus has been reached on the true definition of competitiveness, the term remains controversial amongst economists.

In summary, comparative advantage and competitive advantage are two important concepts in the economics trade theory but with completely different meanings. Both these terms are vital when assessing the intercountry trade capacities of different countries. Therefore, it can be concluded through the above definitions that comparative advantage is the ability of a country to produce products at a cost lower (opportunity cost) than those of competing countries. Whereas competitive advantage from another stand point, takes place when a country proves to be leading in its market sector due to its ability to produce and deliver commodities at higher returns than its competitors, and the products reaching consumers at lesser costs.

2.4 Review of studies conducted on South Africa's competitiveness of certain agricultural products.

The competitiveness of the South African agricultural commodities has been examined by different researchers, however, not all products have been researched and sugar is one of them. Mosoma (2004) found that comparative competitiveness has a huge contribution in assessing trade changes in trade patterns and movements in the SA agricultural sector. Therefore, for the performance and growth of the agricultural sector in South Africa, the competitiveness of agricultural trade is very important. Some of competitiveness studies are discussed in this section.

Ndou (2012) analyzed the competitiveness of the South African citrus industry using the Constant Market Share (CMS). The author argued that CMS is the best applicable tool to measure competitiveness, because the interpretation of CMS model is built on the assumption that variations in market share reflect purely competitive situations. The author also made use of Porter's diamond model (Porter, 1990; 1998) to point out key ecological factors that allow competitiveness and the degree to which they influence the performance of the industry. The author stated that the benefit of using the diamond model is that it assesses all partakers in the supply chain (Porter, 1990; 1998). At the end of the research, the author concluded that the South African citrus industry is still meaningfully performing in export markets, although there are some citrus products which are not as competitive in some countries.

Ndou (2012) also concurred with other authors that infrastructure, particularly the transport system is a common problem for South African exporters. They suggested that

transport problems should be resolved not merely to assist the citrus industry but for the improvement of economic growth. The researcher also recognized that practical back-up of the citrus growers, particularly the emerging farmers and smallholders is an area that requires urgent support. Ndou (2012) recommended that there is a need to promote a constant market share in global markets despite corporate challenges.

DAFF (2011) conducted a study on the competitiveness of nominated agricultural exports in the European Union (EU-27) from 2001 to 2009. The study made use of Revealed Comparative Advantage (RCA) index and Comparative Export Performance (CEP) index approaches to examine data which was obtained from the Intercountry Trade Centre (ITC). The RCA index was used to predict the Relative Export Advantage (REA) of South Africa for chosen agricultural products and industries. At the end of the research, DAFF (2011) concluded that in comparison with global competition, South Africa has been showing competitiveness to the EU-27 in terms of some of the products, and experienced a comparative disadvantage on some other products, which showed that South Africa was uncompetitive in some cases.

DAFF (2011) argued that based on the varying properties of agricultural commodity markets and developing product standards in the world and EU, it remains important to sustain competitiveness of nominated South African agricultural commodity exports in the EU-27, and to improve the competitiveness of South African agricultural exports in these markets. To ensure that the competitiveness of the country's agricultural exports is enhanced some factors were identified by Ortman (2005), which included developing the quality of education and skills training, good governance at all levels of government and

industry, encouraging research in agriculture and implementation of production new technologies.

Kalaba and Henneberry (2001) examined the competitiveness of South African grapes, pears and apples in the European Union. The results of their research showed that the competitiveness of South African exports were the lowest compared to some countries such as New Zealand, Unite States of America, Chile, Turkey and Argentina. They argued that poor quality of commodities could have influenced low competitiveness of these products. Edwards and Schoer (2001) used the revealed comparative advantage (RCA#) index to show that South Africa has a comparative advantage in producing agricultural products, mining and manufacturing of commodities involving these sectors.

Msoma (2004) made use of the relative revealed comparative trade advantage (RTA) index to examine the global competitiveness of the South African agricultural exports in comparison with those from Australia and Argentina. The outcome of the study showed that Argentina and Australia food chains were normally more competitive globally than those of South Africa. The author found that the agricultural industry in South Africa was only slightly competitive globally. The analysis also showed that South Africa has managed to move up the value chain compared with Argentina and Australia. The author recommended that South Africa should consider value-adding opportunities through serious research and expansion of new commodities and production to unlimited value-adding opportunities in the three countries that were examined.

Hallat (2005) made use of three indices, namely; the Revealed Comparative (RCA#), the Net Export Index (NEI) and the Relative Revealed Comparative Trade Advantage (RTA)

index to examine competitive and comparative advantages of the oilseed industry in South Africa. The results showed that sunflower seed and groundnuts in South Africa have a competitive advantage in their primary state. The author also realized that the oilseed in most instances, with value added experienced a competitive disadvantage. The study went further to show that the local oilseed industry experienced difficulties against other value added commodities. These results directed the author to examine the competitiveness of secondary oilseed industry and concluded that the oilseed industry is price-driven. The author suggested that innovations should be introduced in the production of sunflower oil and operational marketing and delivery for the industry to increase competitive advantage.

Mashabela and Vink (2008) used the Relative Revealed Comparative Trade Advantage (RTA) index to measure and compare the competitive performance of the South African deciduous fruit supply chains in comparison with those in Chile. The results of the study showed that the South African deciduous fruit industry had an intercountry competitive advantage in the marketing of deciduous fruit. Nonetheless, the authors observed a decline in the competitiveness of the industry when going further up the value chain. The high value agricultural exports of Chile caused the country to have a strong relative intercountry competitive advantage. The researchers then concluded that, the export arrangement of Chile is largely dominated by high-value commodities than that of South Africa.

The authors suggested that competitive approaches need to be implemented by all in the supply chains in order to increase the competitiveness of the South African industry, also

citing that it is not viable anymore for farmers to compete at farm-gate level, while value-adding activities are not competitive internationally. The authors further argued that value adding ought to become a crucial area for investment, research and technology development.

Du Toit (2009) used the Unit Cost Ratio (UCR) index to examine the factors that influence the long-term competitiveness of certain commercial milk producers in East Griqualand (EG) of South Africa. The author concluded that dairy cattle trading income was the major contributor to the improvement of the competitiveness of East Griqualand dairy enterprises. The author further alluded that the relative competitiveness of EG milk producers was affected by variations in the inherent ability of stakeholders of the EG group to control market deregulation.

Jafta (2014) conducted a study on the analyses of the competitiveness performance of the apple industry. The author made use of the three internationally recognized indices, namely; the Net Export index (NXi), the Revealed Comparative Advantage (RCA#) index and the Relative Revealed Comparative Trade Advantage (RTA) index to calculate the comparative and competitive advantages of apple industry in South Africa. The author concluded that the apple industry has kept a competitive advantage relative to its rivals, and further cited that South Africa was also out performed by some other countries although it obtained a third position in the international apple podium.

Van Rooyen *et al.* (2011) used Relative Revealed Comparative Trade Advantage (RTA) and Porters Diamond Model to evaluate the competitive performance of the South African

wine industry. The findings showed that South African wines were progressively competitive globally, with a robust optimistic trend since 1990, but they nonetheless began to weaken towards 2011. The observations of the researchers also determined that the role of regulation and a supportive government policy environment were extremely appropriate for the competitive performance of the industry.

Sihlobo (2016) made use of different indices, namely; Revealed Comparative Advantage (RCA#) index, Agri Benchmark Production Model, Growth-Share Matrix, Indicative Trade Potential index, Relative Indicative Trade Potential index and Market Attractiveness Index to an evaluate the competitiveness of South African maize exports and the scope to expand the market. His findings showed that South African exports of maize were competitive in comparison with principal international exporters of maize. However, the production cost analysis revealed that South Africa was less competitive relative to other countries.

2.5 Summary

The purpose of this chapter was to deliver a literature review on agriculture competitiveness analyses. The chapter highlighted both positive and negative impacts of the South African agricultural industry to the local economy. The chapter also defined comparative and competitive advantage, and provided a brief review on studies that have been conducted by different authors on the competitiveness of South African agricultural products focusing mainly on the tools, which were used to measure the competitiveness.

CHAPTER 3: A DESCRIPTIVE OVERVIEW OF THE SUGAR INDUSTRY

3.1 Introduction

Porter (1990) stated that the shape of a business defines how it deals with the always-growing domestic and global competition and utilizes or fights the effects of these forces by successfully concentrating on its planned areas. It is therefore necessary to know the South African sugar industry thoroughly, by knowing its competitive status among other markets and the future trends of the industry.

The purpose of this chapter is to provide an outline of the sugar industry. The chapter begins with a brief overview of international trade of sugar, followed by the top ten sugar exporting countries, and the South African position in the sugar industry. This section is necessary to provide the reader with an insight of how the worldwide sugar market has been performing.

3.2. Global outlook of the sugar industry

3.2.1 Brief overview of the international sugar industry

The formulation and application of effective trade policies become necessary although it poses an active, yet complex difficulty for policymakers. Huge economic developments can be attained by reducing or eradicating policies that restrict the trade of food and agricultural products (Penson *et al.,* 2015). Global citizens are widely affected by the rapid globalization; which brings vast opportunities together with serious challenges to the citizens. Tastes are becoming similar and numerous goods we consume are either

produced overseas or possess numerous imported parts and mechanisms, as a result majority of the facilities we utilize are progressively supplied by other countries (Salvatore, 2014).

Requirements for sugar production at the global level are necessary for economic growth and elimination of poverty. They increase and sustain development which is essential for decreasing poverty, by providing companies and household's access to global markets for goods, services and information. They reduce prices and improve the quality and diversity of goods consumed, as well as promoting the specialization of economic welfare in areas where countries possess a comparative advantage (Bhagwati, 1988).

The world sugar market is amongst the highly biased agricultural product markets. Tariffs, quotas, state-regulated retail prices, import quotas, export subsidies, wide spread local support and trade-biased policies normally define the raw and refined sugar market (Nyberg, 2006). Global trade is mostly characterized by preferential trade agreements, whereby sugar-manufacturing countries enjoy easy entrance to higher priced markets in the European Union or the United States of America via the preferential access. For emerging countries, trade through preferential agreements is very vital for the sugar sub-sectors of the majority of countries (Nyberg, 2006). The sugar market ranks among those markets that are highly protected in the global agricultural sector. The market of sugar is controlled in a certain way in nearly all sugar-manufacturing countries. With a growing removal of trade barriers of agricultural trade worldwide in the Millennium round of the WTO trade debates, the question of international competitiveness remains of rising importance (Zimmermann and Zeddies, 2002).

According to Taylor (2017), the world sugar economies are projected to stay constant over the following ten years. Global sugar production improved by 3.0% in 2016 while consumption increased by less than 1%. International sugar prices are predicted to decline to 13.7 cents/lb by 2026. Between 2016 and 2026 global trade quantities of sugar are anticipated to grow throughout the period. Total global sugar trade is predictable to grow by 16.2% from 45.6 million metric tons to 53.0 million metric tons between 2016 and 2026; and sugar prices are expected to decline from $0.166/lb in 2016 to $0.137/lb in 2026. Exporting countries, such as Australia, Thailand, South Africa, Cuba, and Brazil are projected to grow their production and exports during the period and most importing countries are expected to raise their imports (Taylor, 2017).

Hagelberg and Harris (2002) reported that there are numerous important attributes of the international sugar economy, which question why sugar improvements should not be of concern and significance. The authors describe sugar as being among the most basic foods, and one to which both consumers and producers assign a lot of attention to having adequate supplies. Sugar is a rare agricultural product that can be manufactured with equivalent facilities in both temperate and tropical climates. Producers in both industrialized and emerging countries can manufacture sugar and this carries with it clashes of interest over market access. Sugar is one of the most significant single products in international agricultural trade; however, recent improvements in the global sugar economy are only barely understood. Extremely high demands of sugar in the developed countries are the main cause for the importance of the global sugar market, and due to the production area, that is restricted to great degree due to climatic requirements for beetroot and sugarcane.

The international market for sugar is of minimal significance, since only approximately 30 % of the international sugar production is exported and in almost every country, the local sugar market is protected. Majority of sugar exports are based on preference agreements or long-term contracts (ISO, 1997; VSZ, 1991). Only a small portion of about 20 % of the global sugar production is traded under free market conditions. Currently the leading sugar manufacturers internationally are Brazil, the EU and India, although they fulfil different roles on the global market, because of the different vitality of their local consumption (Zimmermann and Zeddies, 2002). Currently only Brazil, Australia, Thailand and partially South Africa can produce sugar under international market conditions. Low production levels in Thailand and South Africa are subject to low wages as well as relatively low ecological and social standards. With the lack of consistent environmental and social regulations, a liberalization of the global market would cause movements of sugar manufacture from beetroot to sugarcane areas with suitable natural, economic and political conditions.

3.2.1.1 Major international sugar exporting countries

The discussion below is from figure 3.1. Brazil dominated the international market with the biggest share of sugar exports of 39 % followed by Thailand (10%) and Germany together with France both at 8%. Brazil is the world's largest producer of sugarcane that is influenced mostly by the favourable climatic conditions. Brazil is also the world's leading exporter of sugarcane and is one of the world's largest consumers of sugarcane (fifth in the world). The United States of America is the biggest consumer of sugar, which means that most of the sugar produced locally is used for domestic consumption and the little

surplus is then exported to other countries. South Africa is not among the ten exporters of Sugar, and statistics for 2015 and 2016 proved South Africa imports sugar more than it exported during these years, causing the country to become a net importer of sugar. The ITC (2017) showed that South Africa was on the 33rd position of sugar exporters worldwide after Russian federation and it also shows that South Africa is not very competitive in the sugar market. The South African sugar inadequacy could be a result of unfavourable climatic conditions and lack of government support for the industry.

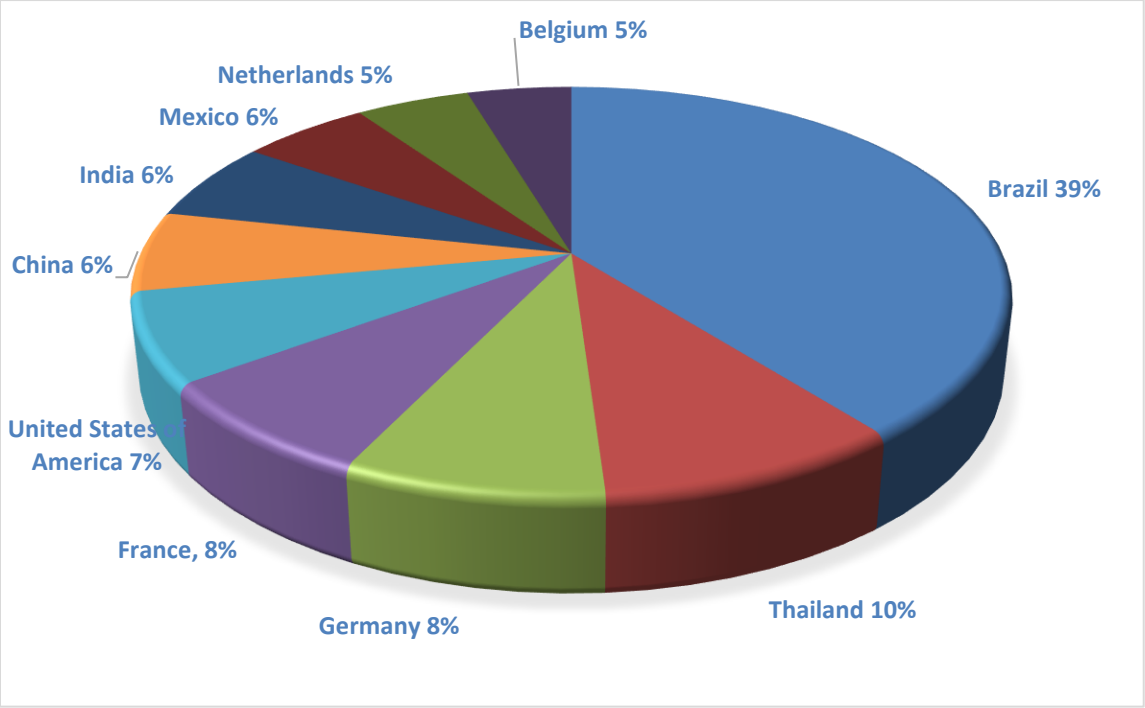

Figure 3.1: Major international sugar exporters

Sources: ITC calculations based on UN COMTRADE statistics

3.2.1.2 Major international sugar importing countries

Figure 3.2 below shows the top ten importers of sugar globally. Some of the countries that appear in Figure 3.2 such as the USA and China are known to be good producers and exporters of sugar, but still due to high consumer demands, they must import large quantities as well. The United States of America is the biggest importer of sugar throughout the period of 16 years, and the rest of the countries had almost the same import values. The large population and high consumption rate of sugar in the USA could be the main reason for high import values of sugar. Germany and UK also imported as much sugar between 2001 and 2010. Indonesia increased its import values towards 2016 and became the second largest importer of sugar until recently. South Africa is on the 29th position in the world importers list with import values fluctuating throughout the years starting with smaller values in 2001 and bigger values between 2010 and 2016.

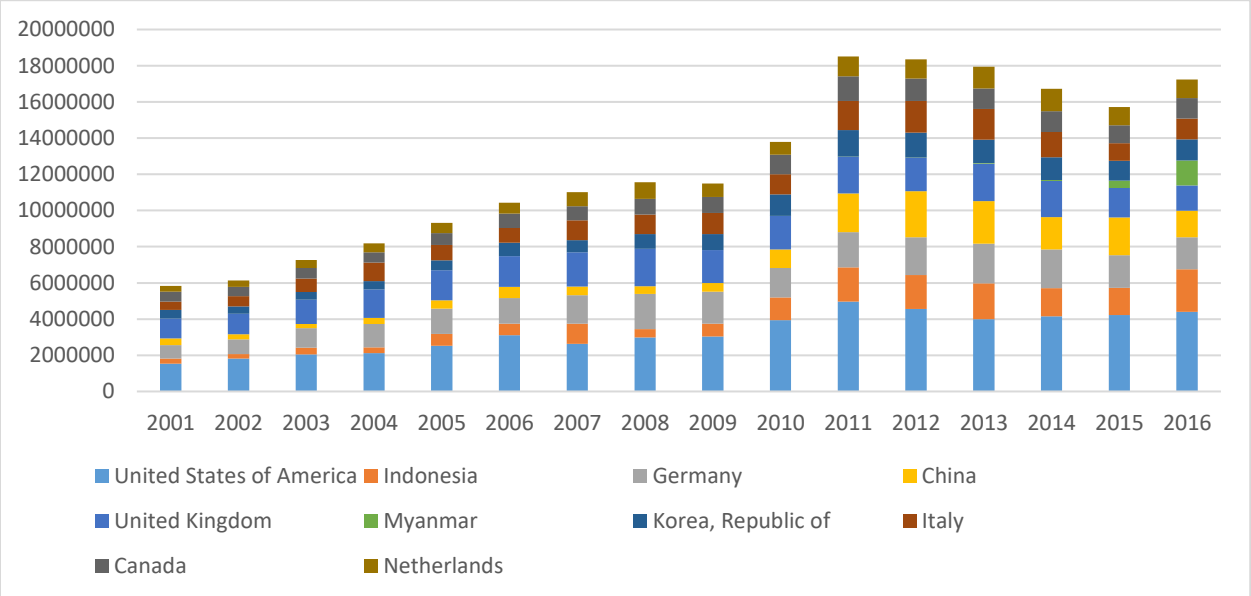

Figure 3.2: Top ten international importers of sugar

Source: Own calculations based on ITC (2017)

3.3 Brief overview of international sugar production

Nyberg (2006) reported that over 130 countries manufacture from sugarcane or sugar beet, and ten of these countries manufacture sugar from both cane and beet crops. Sugarcane is the worldwide biggest crop by production quantity and on average, it accounts for 75 to 80% of international production annually, while emerging countries produce approximately 70% of the overall worldwide yield. Global production of sugar now exceeds 165 million tons a year, out of this quantity approximately 80% is manufactured from sugarcane, which is mostly grown in tropical countries. The remainder of 20% is manufactured from sugar beet, which is grown generally in the temperate zones of the Northern Hemisphere. The ten leading sugar-manufacturing countries account for approximately 75% of the international sugar manufactured (DAFF, 2014).

The world manufacture of sugar is around 1,6 billion tons on an annual basis and is mainly seen in tropical areas, specifically emerging countries in Africa, Latin America and Asia. Brazil alone on the other hand, represents approximately 25% of global production and is the largest producer of sugarcane globally. Between 2012 and 2013, Brazil manufactured 588 million tons of sugar. Sugarcane production in Brazil presently covers 9.5 million hectares, or 1% of the country's total area. The sugarcane produced in Brazil is used to manufacture sugar and ethanol for gasoline-ethanol mixtures for domestic transportation fuel. India uses sugarcane to produce sugar, jaggery and alcoholic beverages (DAFF, 2014).

Brazil does not only focus on the production of refined sugar but anhydrous and hydrous alcohol as well, which are mostly utilized as a mixture in locally consumed gasoline. Brazil's high productivity levels of the sugar industry are mostly influenced by extremely

fertile soil and brilliant growing environments and the country has among the lowest production cost internationally. Sugar manufacturers in that region can produce sugar at a cost that is under $0.06 cents per pound (Schmitz *et al.,* 2002). For this reason, Brazil sugar industry is the most competitive compared with other countries.

The fertilizer industry in South Africa on the contrary, is entirely exposed to international market forces and functions in much deregulated conditions with no import charges or government subsidized provision measures. The fertilizer costs are strongly influenced by global prices, foreign exchange rates and transportation costs. Sugar is the second largest consumer of fertilizer at 18% after Maize, which accounts for 41%. Product differentiation, price incentives and specialized services such as single agronomic advice, custom combination and application are the main drivers of South African fertilizer market.

The fact that South Africa is a net importer of fertilizers causes domestic prices to be impacted by shipping costs and the rand/dollar exchange rate (DAFF, 2016). Most of global fertilizer prices (in dollars per ton) fluctuate on yearly basis and because of the substantial depreciation of the exchange rate, global fertilizer prices increase even more. According to DAFF (2016), South Africa is not among the top ten producers of fertilizers, causing it to import most of its fertilizer from the top producers. The international sugar production remains unpredictable in the long run. The sugar market in emerging countries has not been formally recognized due to the uncertainties in the industry.

Production varies with climatic changes even if acreages are constant. Most commonly, doubt is created by the fact that supply conditions can change very rapidly. The sugar industries of different countries are affected differently by universal developments such as inflation, the increase in oil costs, and the application of new technology. Sugar production in industrialised countries recovered to 42.4 mln tons in 2014/15 after falling to 40.2 mln in 2013.

3.3.1 Graphical presentation of international sugar production

The top ten (10) global producers of sugar over a 16-year period (2001 to 2016) are presented in **Figure 3.3** below. South Africa has been included although it is not one of the top ten countries, to show its production capacity against these countries, and to compare South Africa with some of its rivals. Brazil has been the highest producer throughout the period with a big gap from the other countries, and it's production has been increasing yearly from 2001 with small fluctuations between 2012 and 2016. India was the second largest producer followed by China. The difference between India and other producing countries including China was huge as well. Therefore, it was concluded that Brazil and India produced sugar more efficiently due to favourable climatic conditions in their countries and the support (subsidies etc.) provided to the sugar industry had a big influence on the production capacity. South Africa on the other hand holds the 15th position in the sugar industry after Cuba. The position for South Africa is not as bad considering forces that influence sugar production in the other countries. The sugar industry is a very competitive industry, as a result most countries produce inefficiently in the industry even though they could be more competitive in other sectors.

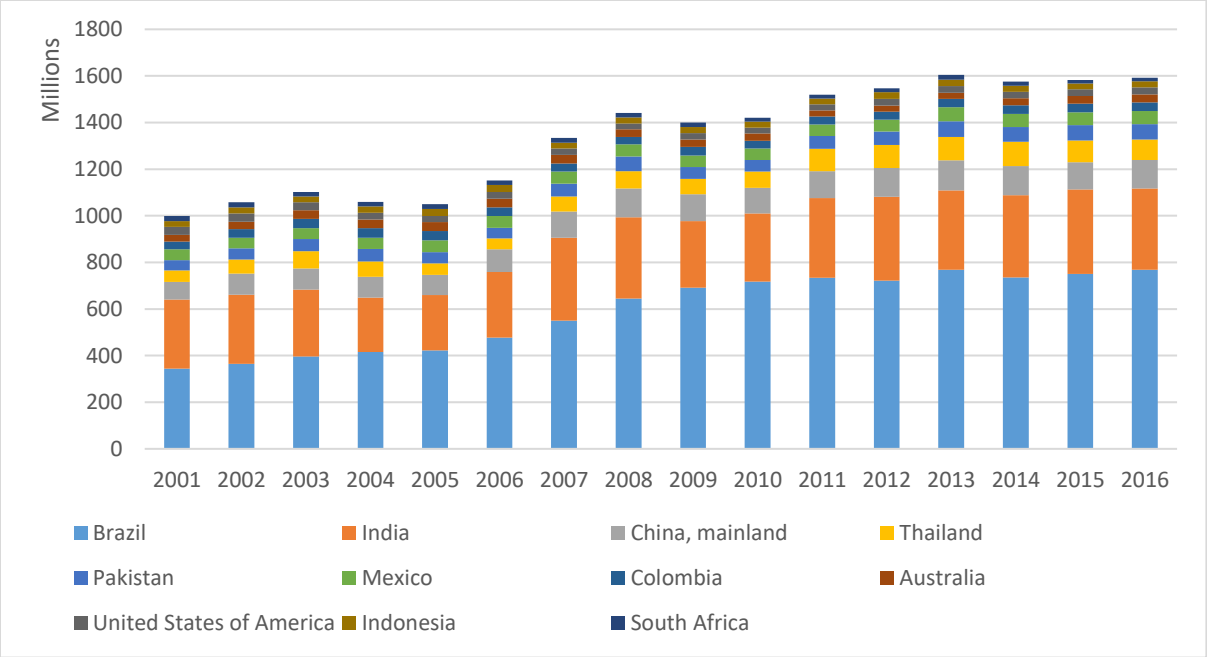

Figure 3.3: Worldwide sugar production

Source: Own calculations based on FAO database (2018)

3.4 South African sugar production trends

Even though diverse varieties of sugarcane possess dissimilar climatic tolerance levels, normally the manufacture of sugar in the commercial level is restricted to regions that are usually free of frost throughout the year where the temperatures are ≥20 ^{O}C during the production season (Bengston and van Rooyen, 1964; Leong and Morgan, 1973). South African sugar industry is based on sugarcane production. Sugarcane is a perennial crop that grows well in tropical and subtropical climate zones. The benefit of the crop being perennial is that it does not fluctuate too much compared with other crops. The sugar crop takes 12 to 16 months to mature and grows on nearly all soil classes, although it requires fertile and well-drained soils. The most appropriate soils for the growth of sugarcane are moist soils with good drainage of 100 to 150 cm deep. Sugarcane grows perfectly in deep,

well-drained environments of moderate fertility of sandy loam soil surfaces with a pH range between 6.0 and 7.7. The best soil pH is approximately 6.5, although sugarcane can withstand some degree of soil acidity and alkalinity. There is approximately 430 000 ha of sugarcane planted in South Africa and an average of 19.9 million tons of the crop is harvested every season from Northern Pondoland in the Eastern Cape Province, the coastal belt in KwaZulu-Natal midlands and the Mpumalanga Lowveld (DAFF, 2011).

The South African sugar industry is ranked 15th out of approximately 120 sugar-manufacturing countries internationally. There are roughly 26,400 registered sugarcane producers in South Africa, covering the three provinces mentioned above (DAFF, 2014). Out of the 26,400 sugarcane producers, 25,000 of them are small-scale producers who manufacture about 10% of the total crop, while large-scale producers manufacture about 83%. South Africa remains one of the world's greatest cost-competitive manufacturers of high-quality sugar.

Sugarcane mills are positioned nearby to the sugarcane farms to reduce transportation costs and sucrose losses. Mills transform sugarcane into raw sugar, which is transported to refineries for additional processing (Taylor, 2017). Raw sugar and refined sugar are not similar products, raw sugar is formed solely from sugarcane and both products are traded globally. Beet sugar manufacturing countries export refined sugar only, while raw and refined sugar is exported by sugarcane producing countries.

In past the share of raw sugar in total sugar exports has been approximately 60%. Sugar production was a 9-year high in 2013/14 but in 2014/15 it was negatively affected by drought. The output in 2015/16 recovered slightly to 2.5 mln tons from 2.4 mln in 2013/14.

3.4.1 Graphical presentation of sugar production in South Africa

This section displays a brief analysis of sugar production in South Africa and the yields between 2001 and 2016 as provided in **Figure 3.4a** below. Major fluctuations were experienced in the industry in 2001 and 2002. The yields from the industry have been very low throughout the period in question. The South African sugar industry was mostly affected by weather conditions and dominated by small scale-farmers who did not produce on large quantities. This could be the reason for the production inefficiency. More investment on the sugar industry could see the industry picking up positively and thus producing more exports for the country, which would in turn strengthen the economic status of South Africa through foreign exchange.

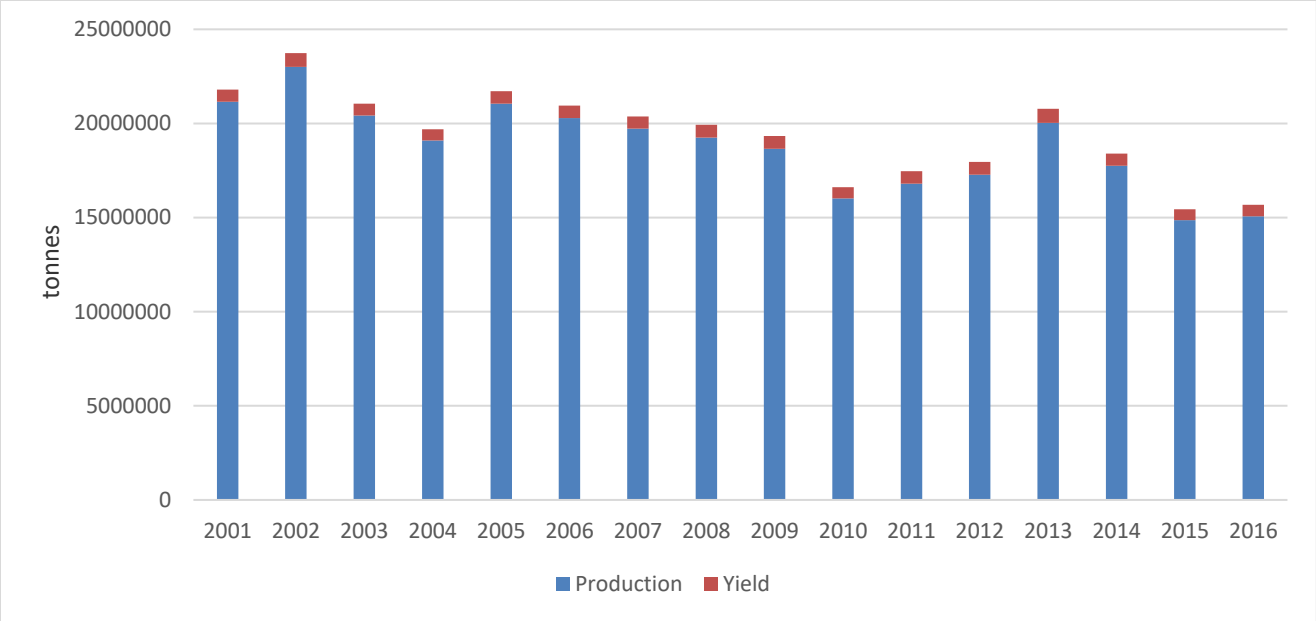

Figure 3.4a: Sugar production in South Africa

Source: Own calculations based on FAO database (2018)

3.4.2 Sugar producing regions in South Africa

Sugar production in South Africa is practiced in the KwaZulu Natal, Mpumalanga, and a little bit in the Eastern Cape, as shown in **Figure 3.4b** below. The KZN sugar industry dominates all other agricultural activities in the KZN province. This is mostly favoured by suitable climatic conditions,that make it easier for farmers in the region to produce efficiently. Small-scale farmers dominate the South African sugar industry.

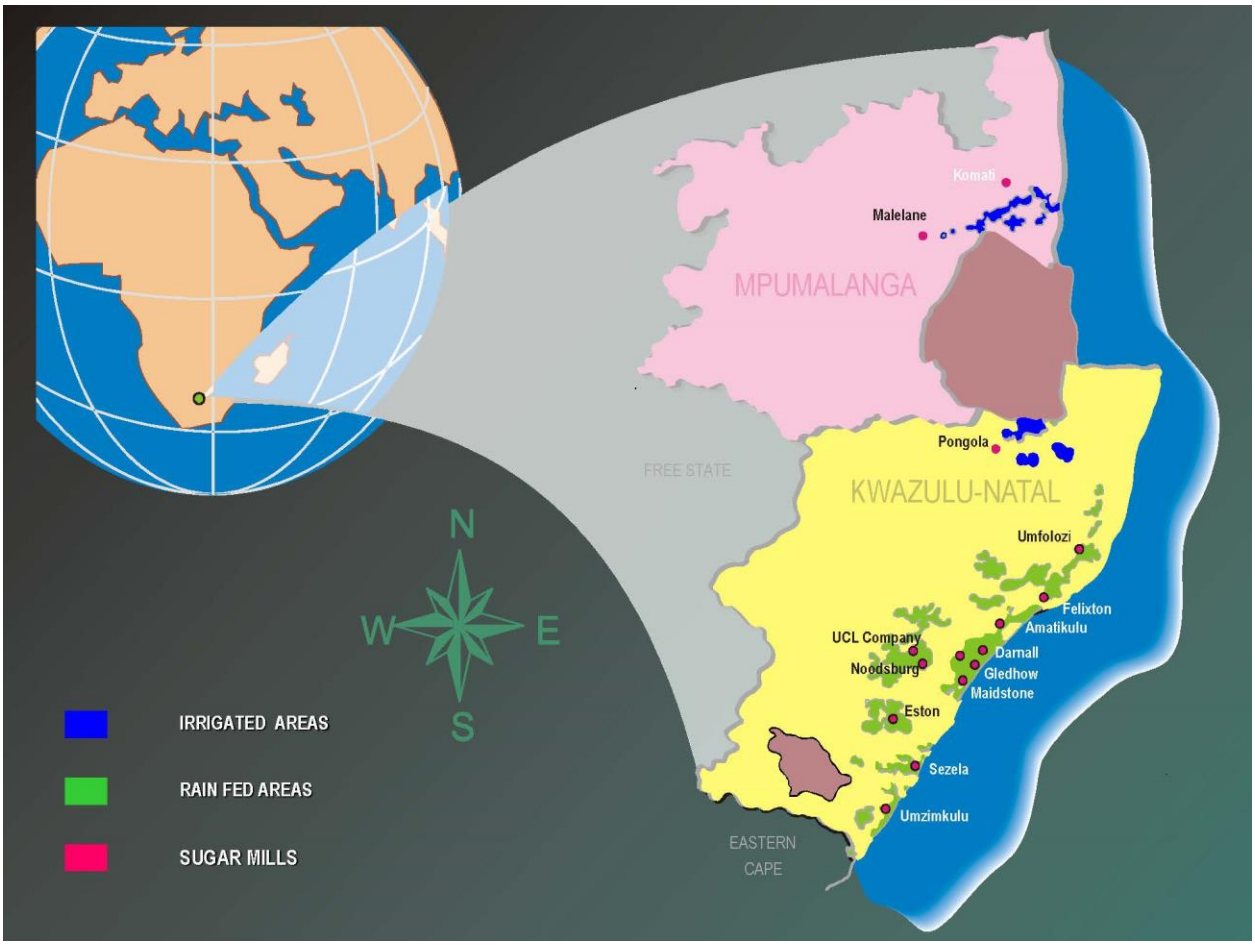

Figure 3.4b: Sugar producing regions of South Africa

Source: South Africa Sugar Authority

3.5 Brief overview of South African sugar trade

The South African sugar industry is one of the most cost competitive industry globally. The industry in South Africa is complex linking sugarcane production to raw and refined sugar, syrup and specialized sugars and a variety of end products (DAFF, 2014). South Africa is in the top 15 cost competitive producer of great quality sugar, but still like any other country such as the USA, it imports large quantities of sugar to satisfy the local demand. Sugar is one of the top 10 agricultural products which are imported by South

Africa from other countries. This clearly should be a concern for the South African sugar industry as it shows that the country does not produce enough sugar for local consumption. Most of sugar produced in South Africa is exported to SACU trade bloc and the surplus is also exported to markets in Africa, Middle East and Asia. However, South Africa remains one of the world's most cost-competitive producers of high-quality sugar even under the unfavourable climatic conditions that are often experienced by growers of sugarcane. According to DAFF (2011), sugar industry in South Africa produces an average of 2.2 million tons of sugar each season and approximately 60% of this sugar is exported to the Southern African Customs Union (SACU).

3.5.1 Sugar export trends in South Africa

The export and import value trends of sugar worldwide over a sixteen-year period, (2001 to 2016) is illustrated in **Figure 3.5a** below. The reason for selecting this period was due to the availability of data which did not exceed 2016. The values of exports have fluctuated as seen in **Figure 3.5a.** In 2001 the value of exports was between 300 000 USD and 400 000 USD. After 2001 the value of sugar exports declined and picked up again slightly in 2005 and 2006 followed by another decline thereafter. Even though the value of exports declined in most years, South Africa has always been a net exporter of sugar except for 2015 and 2016 when the import value of sugar exceeded the exports. Between 2015 and 2016 South Africa experienced severe drought, which affected most of the agricultural products including sugar production, thus the sharp decline in sugar exports. South African exports were mostly strengthened by citrus fruit and wine industries. The sugar

industry is less competitive among the top 10 agricultural products which are exported annually.

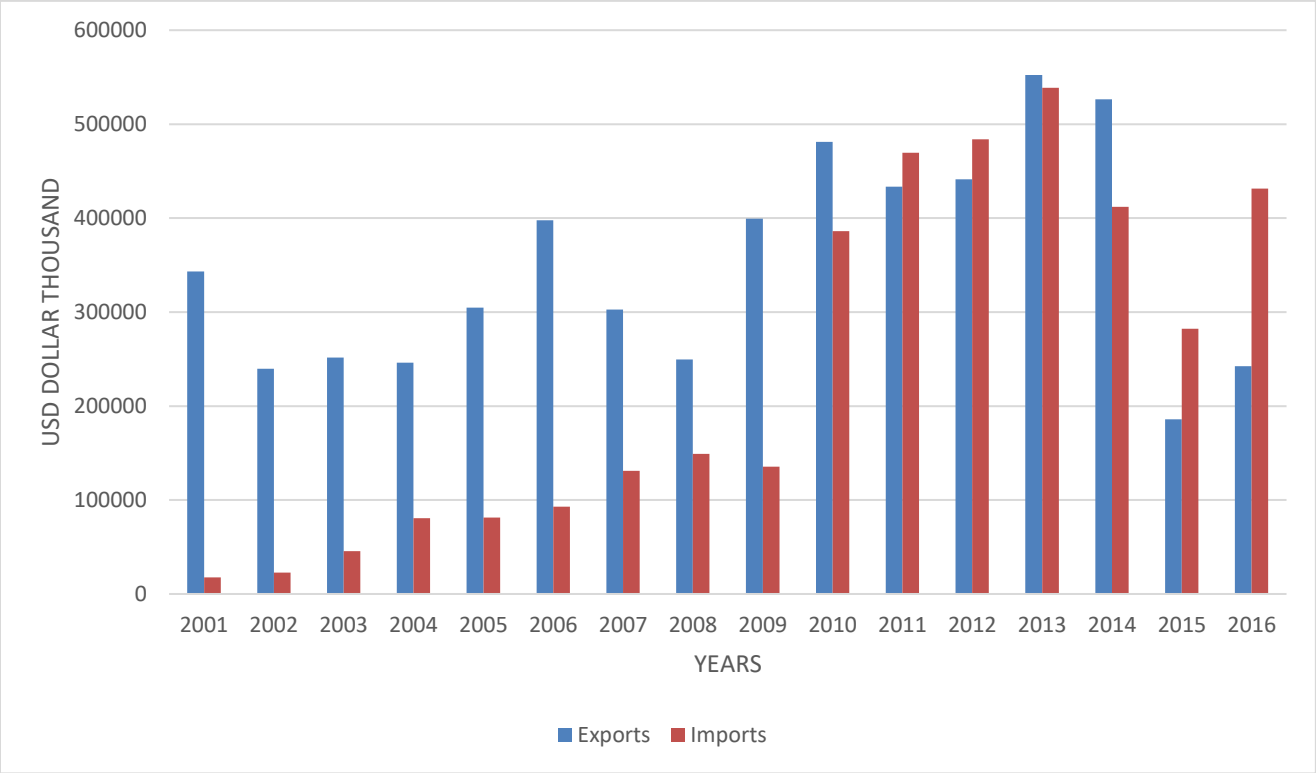

Figure 3.5a: Exports and imports of sugar in South Africa

Source: Own calculations based on ITC (2017)

3.5.2 Sugar import trends in South Africa

South Africa imports sugar even though it has been exporting to other countries for many years. **Figure 3.5a** above also shows the import values of sugar over a 16-year period. It is evident that there have been fluctuations on the value of exports and imports over the years. Imports increased slightly from 2001 to 2008 and in 2009 there was a decrease in imports value, which was due to the improvement in production capacity. In 2010 a very

noticeable increase in the value of sugar imports was observed, the values of both exports and imports were very high until 2013. The statistics show that there was a decline in the sugar exports between 2015 and 2016, when imports were greater than exports during those years. That made South Africa a net importer of sugar in 2015 and 2016. When compared with the rest of world, sugar industry in South Africa has been performing better than many other countries.

3.5.3 Top exporters of sugar to South Africa

The top 10 countries that export sugar to South Africa are shown in **Figure 3.5b** below. Between 2001 and 2009 Brazil was the top supplier of sugar to South Africa and in 2010 Swaziland took over as the top supplier of sugar to South Africa until 2016. During that time, Brazil took the second place in exports to South Africa followed by China, United Arab Emirates, Mozambique, France, Argentina, Switzerland, United States of America and India. South Africa and Swaziland are both members of the Southern African Customs Union (SACU) and the Southern African Development Community (SADC). These two countries share Preferential Trade Agreement and Free Trade Agreement, which enables them to enjoy the benefits provided by the trade blocs to member countries. South Africa has trade agreements with majority of the top 10 suppliers listed above, but the agreements only apply to selected products and since sugar is treated as a sensitive product when countries trade, it is unlikely for sugar to enter the markets with the benefits that are received by other normal products.

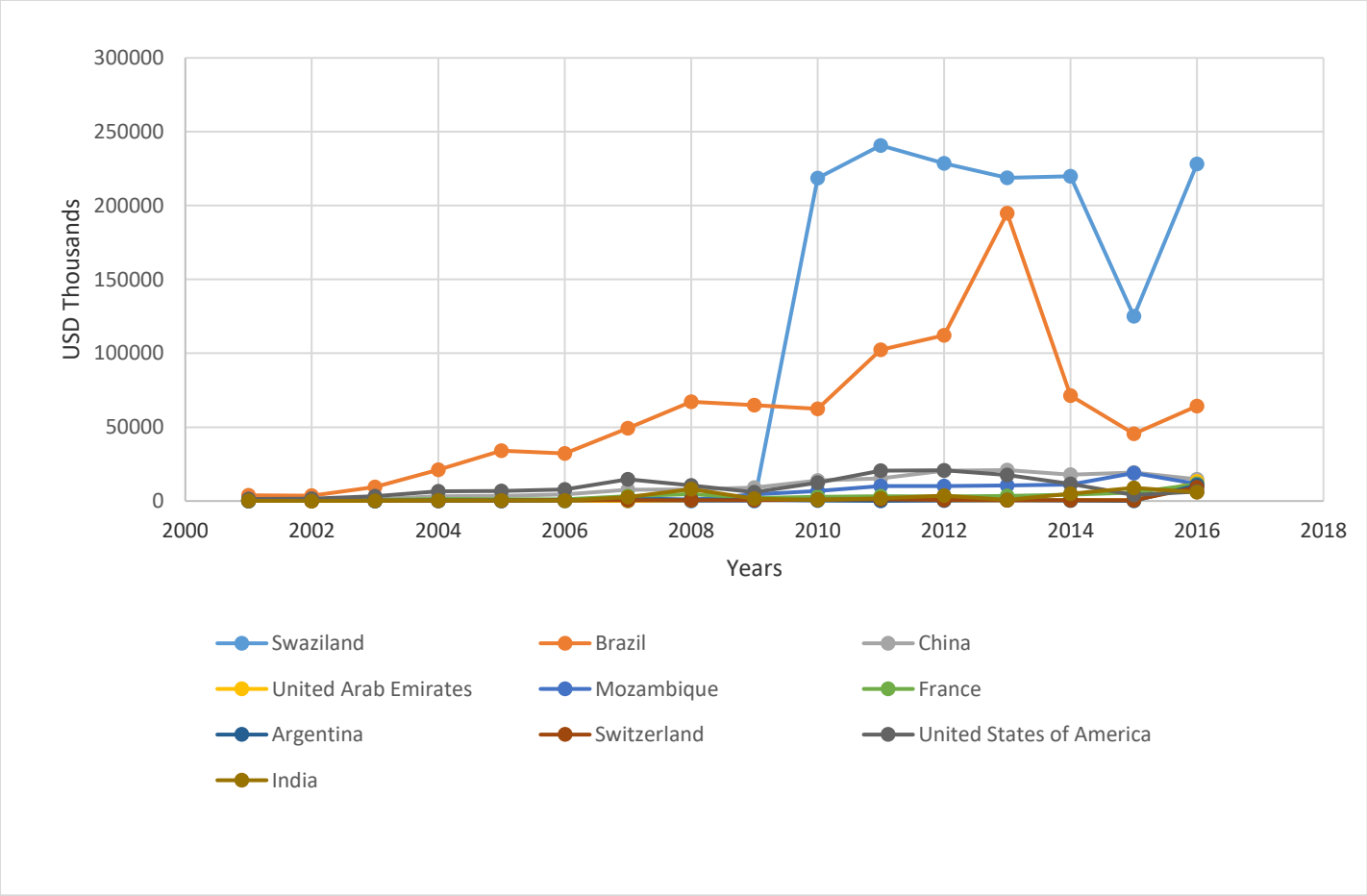

Figure 3.5.b: Suppliers of sugar to South Africa

Source: Own calculation based on ITC (2017)

Swaziland is the only country amongst the top ten suppliers of SA, which exports sugar to South Africa at 0% tariff rate. Sugar from all the other countries carry duties in South Africa and this justifies the number 1 position for Swaziland in the South African sugar market. It is also important to note that these statistics were for a period between 2001 and 2016. The results for 2017 were released while the study was already in progress. Slight changes on the worldwide trade statistics for sugar were observed in the 2017, where India was eliminated from the top suppliers of sugar to South Africa. The different results between 2016 and 2017 provide the opportunity to compare how countries

performed before 2017 and how they performed after 2017, as it became clear that most countries trade levels changed drastically after 2016, as discussed in chapter 5.

3.5.4 Destination countries for South African sugar exports

The top ten destination countries for South African sugar exports from 2001 to 2016 are shown in **Figure 3.5c** below. Sugar exports from South Africa between 2001 and 2008 were very low. The major destinations were the United States of America and Angola. In 2009, a slight increase in the value of exports was observed and the major destination country was Zimbabwe.

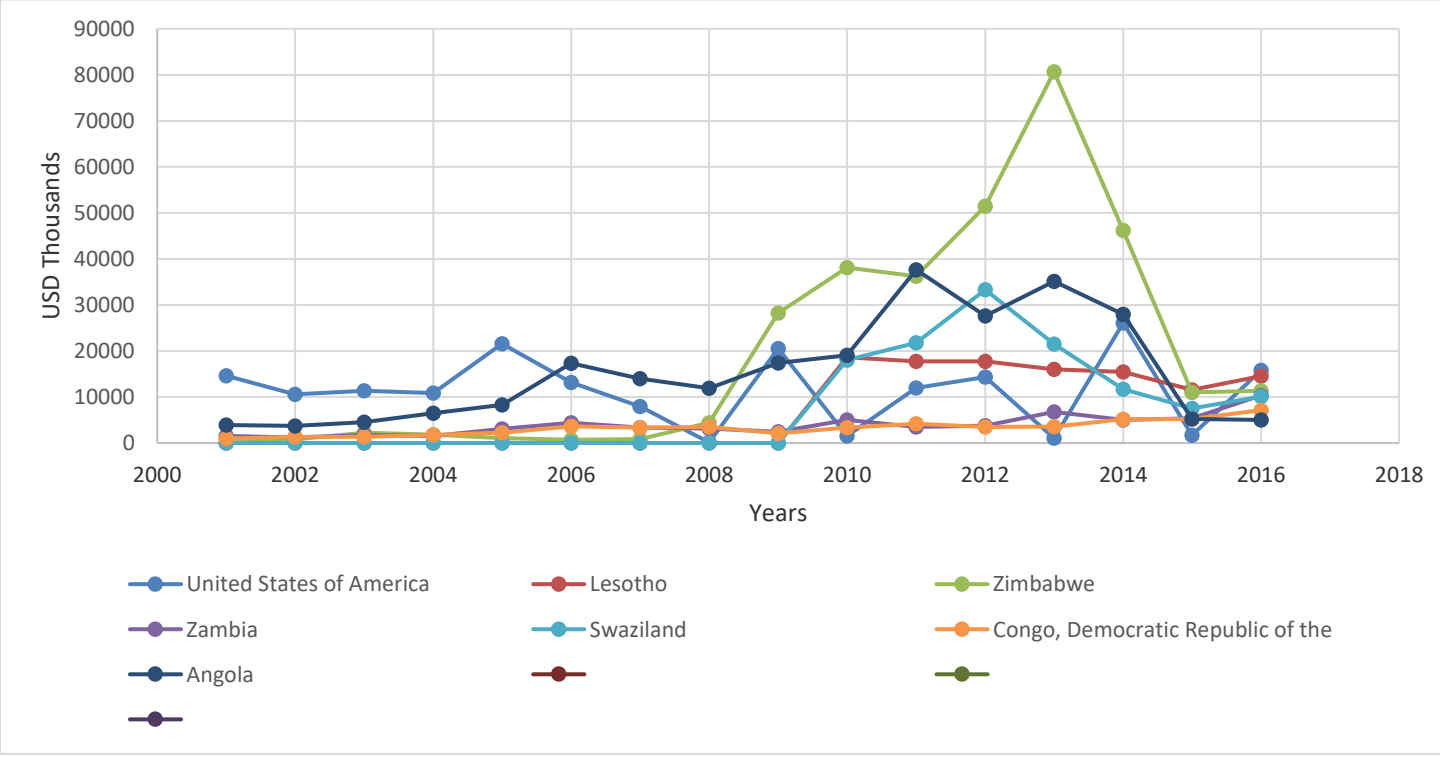

Figure 3.5c: Destination countries for South African sugar exports

Source: Own calculations based on ITC (2017)

This was a result of trade agreements between Zimbabwe and South Africa, since both nations are members of Southern African Development Community (SADC). South African sugar millers face competition from sugar millers in SADC countries in terms of the SADC Free Trade Agreement. South Africa has been a net exporter of sugar for many years, except a few years when imports recorded to be very high. Low production and trade capacity of the sugar industry could be influenced by sugar trade policies, inefficient production due to lack of enough government support, and inability to compete with major countries that are offered export subsidies by their governments.

3.6 The South African standpoint of the sugar industry

3.6.1. The contribution of the industry to the South African economy

The sugar industry in South Africa through its agricultural and industrial investments, high jobs creation, networks with key suppliers, foreign exchange earnings, support industries and customers delivers very significant influence on the domestic economy. The sugar industry is complex merging agricultural activities of sugarcane production with the factory processing of raw and refined sugar, thus creating more employment for the local people. The South African sugar industry is credited for creating approximately R8 billions of incomes each year through its sales to the SACU trade bloc and the surplus that is exported globally.

The sugar industry also provides a significant support to direct job creation in sugarcane production and processing; and delivers indirect employment for several support industries in the three provinces where sugarcane is produced. The sugar industry

produces roughly 79 000 direct employment and about 350 000 jobs of indirect employment. In the 14 sugar mills of the industry, 12 571 people are employed in the milling sector. The sugar industry in South Africa benefits almost one million people (SASRI, 2015).

According to Tongaat (2018) the sugar industry in South Africa is a big creator of jobs especially in rural areas and it assists in sustainable improvement of the country's economy. The Sugar industry delivers education and training; and adds to superiority in research, science and technology. It ensures that the sustainable utilization of natural resources is achieved. Job starved areas especially in the disadvantaged rural areas where there are no other economic activities benefit from jobs in the industry. Renewable energy is one of the sectors that could benefit from the sugar industry soon.

The South African sugar industry has seen the need to encourage diverse possession of land under sugarcane, and a requirement for different support measures is in place to encourage the sustainable land allocation. The initiatives provided very important support to the transfer of 21% of land, which is used for commercial sugarcane production from white farmers to black farmers. The Land reform process began in 1996 when Tongaat Hullet and Illovo Sugar decided to transfer land under their possession to black farmers in the sugar industry who are experienced in the growing of sugarcane. This practical initiative resulted in 18 789 ha of land transferred to 170 black farmers (SASA, 2014).

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the research methodology and model description. The key drive of the section is to provide an understanding of the research methodology to clarify the indices that are used to measure the competitiveness of the local sugar industry relative to its competitors. Leedy and Ormrod (2001), described research methodology as the common method the researcher adopts in undertaking the research project. The chapter contains the following features of the methodology: the research design, description of the study area, the main sugar producing regions in South Africa, data collection instrument and procedure, reliability and validity of the study, ethical consideration and data analyses.

4.2 Research design

A research design is the practical strategy in which certain research approaches and processes are linked collectively to attain a trustworthy and effective body of data for empirically grounded analyses, conclusions and theory formulation. The research design guides a researcher with a pure framework, which leads the approaches, choices and sets the foundation for analysis. The study design decides the procedures and approaches: the kinds of measurement, the sampling, collection of data and the analyses be used for the study (Zikmund *et at.,* 2010).

Research design concentrates on the final product and all stages taken to achieve the outcome. The purpose of applying the research design is to ensure that appropriate

research techniques are adopted to ensure that goals and objectives set in the study are obtained. The study assessed the competitiveness of sugar exports in South Africa by following quantitative approaches of Balassa (1965), and the International Trade Centre (2016) Market Attractiveness Index was used for extraction of data. Quantitative approach was adopted for this study.

Guided by the research question and objectives, the study made use of quantitative methods to examine the competitive performance and analyze the improvements that could be adopted to increase the competitiveness of the sugar industry in South Africa. The use of secondary data was adopted for the study with a 5-steps approach. The steps taken involved the following:

Step 1: Defining competitiveness.

Step 2: Measuring competitive performance of the sugar industry in South Africa.

Step 3: Gathering information using the Trade Map, Globally Trade Atlas and Food and Agricultural Organizations (FAO) of the United Countries database to collect raw data on production and trade levels of the sugar industry. Then analyzing the information with the use of the Relative Revealed Comparative Trade Advantage (RTA) index, the Net Export index (NXi) and Vollrath's (1991) improved original version of the Balassa's Revealed Comparative Advantage (RCA) index.

Step 4: using the Trade potential index (TPI) to analyze top potential markets that South Africa can exploit for its sugar exports.

Step 5: Recommending strategies that could be adopted to supplement the

performance of the sugar industry in South Africa.

4.3 Brief description of the study area

South Africa occupies the southern tip of the African continent. Its neighboring countries are Zimbabwe, Swaziland, Namibia, Mozambique, Lesotho and Botswana. South Africa consists of nine provinces, namely; Eastern Cape, Free State, Gauteng, Kwazulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape. There are huge differences between the size of the provinces, from small and populated Gauteng to the huge, dry and near empty Northern Cape. The country has a rich and diverse economic culture, made up of both rural and urban economies. The country can be divided into different agricultural areas, and agricultural undertakings ranging from crop production in winter rainfall and high summer rainfall regions, to cattle ranching in the bushveld and sheep farming in the more arid areas (Goldblatt, 2009).

The population of South Africa has been increasing steadily at a slow pace over the years. According to Statistics South Africa (2016), the population has grown from 47.4 million in 2006 to 55.9 million in 2016, a yearly average growth rate of 1.7%. KwaZulu-Natal had the highest population followed by Gauteng according to 1996 and 2001 census statistics. However, in a community survey conducted in 2007 and census 2011 Gauteng had the highest population in the country followed by KwaZulu Natal. The population of South Africa is anticipated to reach 82 million by 2035 (Goldblatt, 2009).

4.4 The main sugar producing regions in SA

There are 14 sugarcane-producing regions in South Africa spreading from the coastal belt of KwaZulu Natal midlands, to the Mpumalanga lowveld and a small portion in Northern Pondoland in the Eastern Cape Province. On the 430 000 ha that is presently occupied by sugarcane, approximately 68% of it is produced within a range of 30 km of the coast with 17% in the high rainfall areas of KwaZulu Natal. The remaining sugarcane is produced in Pongola and Mpumalanga lowveld areas (DAFF, 2011).

Sugarcane is a planned produce of KwaZulu Natal and Mpumalanga, where sugar manufacture is also situated, encompassing approximately 50% of field crop gross farming income across the two Provinces. Sugarcane plantations in KwaZulu Natal are some of the top agricultural practices performed by the people of the two provinces, which contribute to the economic status of the whole country through their exports. In KwaZulu Natal Province sugarcane is produced in Pongola, Umfolozi, Felixton, Amatikulu, Darnall, Gledhow, Maidstone, Sezela, Umzimkulu, Dalton, Noodsberg and Eston areas. In Mpumalanga Province, sugarcane is produced in areas such as Malalane and Komatipoort (Daff, 2014). KwaZulu Natal has proven to be the main producer of sugar in South Africa, with the majority of farmers located in the province, the crop surpasses any other crop that is grown in the province.

4.5 Data collection instrument and procedure

Polit and Hungler (1999) explain data as information attained in the course of research. The study approach adopted in this research carefully resembles that of a cluster study. This study used quantitative methods approach to gather data. This method enabled the researcher to exclude the need to collect primary data through survey. The study and analyses were based on secondary data from reliable sources. In addition, numerous forms of data were obtained; and statistical and text analyses were executed. This provided an understandable analysis of the research problem (Creswell, 2003).

Substantial utilization of secondary data from International Trade Centre, FAO and the Department of Agriculture, Forestry and Fisheries were essential for the study with the assistance of Excel spread sheet. This type of data were used to assess the competitiveness or status of sugar exports and imports, and to identify new marketing channels for the South African sugar industry.

Time series data was important for the study to be carried out since it was possible to evaluate exports and imports over a long period. The data was collected from different reliable databases and these databases are the Trade Map, Globally Trade Atlas and Food and Agricultural Organizations (FAO) of the United Nations. Various indices were used in the study, namely; the Vollrath's (1991) improved original version of the Balassa's Revealed Comparative Advantage (RCA#) index, the Relative Revealed Comparative Trade Advantage (RTA) index and the Net Export index (NX_i) to analyse the raw data that

was extracted from the databases. An excel spreadsheet was also used in making sure that the models provide accurate values.

4.6 Validity of the model of analyses

Validity is a confirmation of how true or false the data is, with the use of a research tool. It is categorized as internal and external validity of the determining tool (Burns and Grove, 2001). The models that were used were validated by senior agricultural economists or professors to ensure that the models were appropriate, scientific, rigorous and sufficient for the analyses.

4.7 Ethical consideration

Research ethics is vital in research activities, since it requires that scholars must safeguard the self-respect of their subjects, and to broadcast well the information that is studied (Fouka and Mantzorou, 2011). The following were done for ethical compliance:

- The study complied with the regulations/ethics requirements of UNISA.
- The data and results of the analyses were used sorely for the purpose of this study.

4.8 Data analyses

The purpose of this section is to give a brief summary of the indices that were used to assess the competitiveness of the sugar industry and the model that was used to explore potential markets for the country's exports. All three indices namely; RCA#, NXi and RTA are discussed briefly to give the reader an insight of what to expect in the following chapter. To investigate the potential markets that could be exploited by South Africa to

increase its exports, the trade potential index (TPI) was adopted. The TPI scores for different countries were calculated and compared against each other to see which countries had the highest scores and to investigate nations with lowest scores. The countries with higher scores were then considered as South Africa's potential destination markets for the exports of sugar. The only data required for this study were trade statistics, which were generated from the data that was extracted from the International Trade Centre (ITC).

4.9 Methods and indices used to investigate competitiveness

Competitiveness measurement is a very debatable subject because of the complexity of the term. Different individuals have different understandings of the measure of competitiveness. Measurement of competitiveness depends on the level at which it is measured at the examining country, such as at firm level, sector level or at all economy levels. The diversity of the competitiveness term has resulted in numerous measurements implemented in economics by different individuals. Many authors have explained the term in different ways to guide the results of their researches; as a result, several techniques and indices have been used to investigate comparative and competitive advantages. Some of the measurements that have been developed by different economists include, Resource Cost Ratio (RCR), Net Social Profitability (NSP), Trade Performance Index (TPI), Revealed Comparative Advantage (RCA), Policy Analysis Matrix (PAM), and Domestic Resource Cost (DRC) (Esterhuizen and Van Rooyen, 1999).

Turner and Van't Dack (1993) and Ferto and Hubbard (2002) claimed that there is not a common measurement that can be perceived as the most appropriate display of competitiveness or comparative advantage. The proof is the failure of all scholars to agree on a single definition of the term, the foundation of comparison and the sum of measurements involved in the determination of competitiveness (Esterhuizen *et al.,* 2001). Therefore, for each study the author selects the measurement that suits the objectives of the study, and the definition of the terms would be linked to the selected methodology.

The objectives and research question of this study adopted the three globally recognized indices, namely; Vollrath's (1991) improved original version of the Balassa's Revealed Comparative Advantage (RCA) index (denoted as the RCA# to differentiate it from the original RCA), Relative Revealed Comparative Trade Advantage (RTA) index and Net Export index (NXi). All these indices were applied simultaneously to ensure all gaps that existed in the individual indices were closed. The indices were used to measure the competitiveness of South African sugar industry relative to the top ten global exporters of sugar. All the indices are popularly used to determine the competitiveness at sector level, where there is a comparison between trends and countries in the global market (Banterle and Carraresi, 2007). Below is a brief clarification of all the indices adopted in this study.

Revealed comparative advantage (RCA) index

Hinloopen and Marrewijk (2001) stated that the usage of RCA index is popular among academic researchers and policy makers for detecting weak and strong sectors in a country. RCA# was adopted in this study to analyze the comparative advantage of sugar

industry in South Africa. However, the index has been broadly criticized by different authors because it only considers exports and ignores imports.

According to Galleto (2003) and Winkelman *et al.* (1995), the Revealed Comparative Advantage (RCA) index is among the greatest common and operative methods of examining industrial competitive performance. The index has a long history of practical use and has earned higher recognition among the applied trade economists. Vollrath (1991) proposed that with distinguishable commodities, intra-industry trade and movements of imports and exports, the total trade impacts ought to be considered. Hence, Galletto (2003) suggested that the RCA# and NXi ought to be applied together to measure and examine the comparative advantage and competitiveness of an industry or a product, since the NXI considers both imports and exports of the commodity in consideration. Lieser (1958) was the initial user of the RCA index to evaluate the possible influence on British industry of entry into the European common markets, prior to the refinement and popularization by Balassa (1965).

Balassa (1965) explained the RCA of a commodity as the proportion of that commodity in international trade. It measures a country's exports of a single product in relation to its share of the rest of all traded goods. It is a measure of a country's exports of a commodity compared to its total exports, and to the equivalent export performance of a group of countries (Ferto and Hubbard, 2002). With a set of reference countries, the Balassa RCA index evaluates normalized export shares, where the normalization applies to exports of the identical industry in the set of reference countries.

If XAj is a country, A's export value of industry j, Xrefj is industry j's export value compared to the set of reference countries, and we outline Xi = □jXij for i=A, ref, then country A's Balassa RCA index for industry j, i.e. RCAAj, equals:

RCAAj = (XAj/XA)/(Xrefj/Xref)

In a case where the index has a value larger than 1, the country possesses a revealed comparative advantage in the commodity, whereas a value less than 1, demonstrates a comparative disadvantage. Therefore, if RCAAj surpasses 1, country A is assumed to possess a comparative advantage in industry j, because this industry is much significant in country A's exports than the exports of the other countries.

The benefit of using the Balassa's RCA index is that it requires only trade figures. Therefore, the quality of findings depends on the quality of trade statistics that are obtainable for the examining country. The index is also said to have some measurement challenges, since it is explained in a form of prices before trade that is hard to observe (Bender and Li, 2002; Botha and Jooste, 2004). The index presumes that the actual design of competitive advantage is seen from after trade data, since trade data show only after trade circumstances. The actual trade patterns can be biased because of government involvement, which can cause distortions of fundamental competitive advantage results. It becomes a problem when government interventions such as import limits, export subsidies and other policies aimed at protecting domestic industries bias the RCA results.

Bender and Li (2002) and Botha and Jooste (2004) believed that the RCA is still an appropriate measure, since the effect of variations in trade policies may be removed from the trends of the RCA, although it ceases to differentiate between a region's factor endowment. Since initially recommended by Balassa (1965), the use of RCA has been reviewed and improved, as shown by Vollrath (1991) improved version of the initial RCA. The advantage of the Vollrath (1991) improved version of Balassa is that, it considers both the exports and imports of a sector.

Bender and Li (2002) and Botha and Jooste (2004), had a mutual agreement that the Vollrath's (1991) RCA# index, is a more suitable measure of competitiveness since a set of countries is anticipated to have a much larger effect at international level than any single economy. This index is represented as RCA# to distinguish it from original version of Balassa. The RCA# index considers the importance of a country's exports in a specific sector and at international level. It eradicates any double counting challenges in global trade.

Vollrath's (1991) RCA# is expressed mathematically as:

$$RCA\#_i = \frac{\left\{\frac{X_{ij}}{\left(\sum_i X_{ij}\right) - X_{ij}}\right\}}{\left\{\frac{\left((\sum_j X_{ij}) - X_{ij}\right)}{\left((\sum_j \sum_i X_{ij}) - (\sum_j X_{ij})\right) - \left((\sum_i X_{ij}) - X_{ij}\right)}\right\}}$$

where X_{ij} are the exports of sector "i" of country "j"; $\sum_i X_{ij}$ are the total exports of a country "j"; are the global exports of sector "i"; and $\sum_j \sum_i X_{ij}$ are total global exports.

When the RCA# index is more than 1 that indicates that country i has a comparative advantage in product j, and, hence, revealing competitiveness. When the RCA# index is below 1, it indicates that country i does not have a comparative advantage in the product.

According to Edwards and Schoer (2001) and Botha and Jooste (2004), there is no substantial distinction between the empirically calculated RCA and RCA#. Edwards and Schoer (2001) found a significant correlation coefficient of more than 0.8 between the RCA and RCA#. Therefore, only Vollrath's (1991) RCA# was adopted for analysis of competitiveness of the sugar industry in this study.

Relative revealed comparative trade advantage (RTA) index

Vollrath (1991) provided a different measurement of the RCA index that could be used to analyze competitiveness, namely; the Relative Revealed Comparative Trade Advantage (RTA) index. The RTA index defines a country's share of the international market of a single product in comparison to its share of all traded goods. The RTA considers both export and import actions and proves to be advantageous from the stand point of trade theory and globalization movements. As a result of the escalation in intra-industry trade, this has become more important (Frohberg and Hartmann, 1997). RTA is calculated as the difference between the relative export advantage (RXA) and the relative import advantage (RMP). Mashabela (2007) argued that the RTA technique provides an understandable measurement of competitiveness under real-world circumstances, such as irregular economic playing fields, biased economies etc.; which allows for the comprehensive measurement of competitiveness.

The model is mathematically calculated as follows:

RTAij = RXAij – RMPij

where RXAij = (Xij/□l, l≠j Xil) / (□k, k≠j Xkj / □k, k≠i □l,l≠j Xkl) while RMPij = (Mij / □l, l≠j Mil) / (□k, k≠i Mkj / □k, k≠i □l, l≠j Mkl)

X and M are exports and imports, respectively, with i and j representing the country categories. On the other hand i and k represent commodity categories. The numerator in both equations is equivalent to a country's exports (imports) of a commodity in relation to the exports (imports) of this commodity from all countries, except for the country that is examined. The denominator interprets the exports (imports) of all commodities, except for the product in question from the respective country as a percentage of all other exports (imports) of all other commodities. The degree of these indicators symbolizes the level of competitiveness of export and import perception. Index values more than zero represent a competitive trade advantage while values less than zero represent a competitive trade disadvantage. RTA considers both exports and imports.

For this reason, the RTA index is perceived the best measure of competitiveness, since it considers both exports and imports, and it is a more understandable measurement. The index provides a clear difference between a product and the rest of the other products, and between a country and other countries, which eliminates country and product double calculation.

The RTA index gives an allowance for the measurement of competitive performance under the actual world circumstances (Esterhuizen and Van Rooyen, 2006; Vollrath, 1991). Nonetheless, there are some problems that exist with the use of the RTA model. The model can distort the underlying competitive advantage (Ferto and Hubbard, 2002). It can also not consider how a country receives its market share (Mosoma, 2004). For that reason, it is important to be cautious when presenting RTA findings, and when comparing a cross-section of RTA indicators, because some factors may be altered and affect the RTA indicators.

Table 4.1 below provides some guidelines on how to present dissimilar cases of the RTA index. To consider the first case, a real value of the indicator may be used to compare distinguishable RTA indicators for different goods traded for one country with similar reference countries. The greater the indicator value, the bigger the competitiveness the commodity possesses over other commodities. In the second case, a country's competitiveness for a commodity is compared alongside different reference countries. The RTA indicator obtained will enable the researcher to observe the significance of the traded product to the products of different trading associates. In the third scenario, caution needs to be taken, since economies of different volumes will have an impact on the absolute value of the RTA indicator. Nevertheless, with the application of trend analysis, competitiveness of different countries can be comparable.

Table 4.1: A framework for interpreting different cases of the RTA index

Case	Country or group of countries to be analysed	Commodity product or commodity group	Group of reference countries	Interpretation
1	Same	Different	Same	RTA indicators can be compared between commodities. The higher the value of the indicator, the greater the competitive advantage the product has over the other products in the country that has been analysed.
2	Same	Same	Different	A specific country's competitiveness for a specific commodity is compared to different reference countries. A comparison of the RTA indicator rank enables the determination of the relative importance of the traded commodity with different trading partners.
3	Same	Same	Same	Special caution needs to be exercised in this case. The index is affected by the size of the economy. Trends should preferably be used to compare competitiveness between the countries.

Source: Adapted from Valentine and Krasnik (2000).

Net export index (NXi)

As a result of the disapproval of the RCA index, because the model considers exports only and overlooks imports, an alternative measurement, the Net Export Index (NXi) was developed, to calculate the comparative and competitiveness advantage. Vollrath (1991) stated that with distinguishable commodities, intra-industry trade, and movements of

imports and exports, the overall trade effects should not be overlooked. Balassa came with a different measurement of competitiveness, namely; the Net Export Index, where the sum of the NXi is given by the total exports minus total imports of a specific product. To calculate the values using this index one only requires exports and imports of a product. One can also calculate the Net Export index by dividing the numerator (Xi – Mi) by local production (Yi), instead of total trade (Traill and Gomes da Silva, 1996). The NXi index equation is expressed mathematically as:

$$\mathbf{NXi = [(Xi – Mi)/(Xi + Mi)] \times 100}$$

In this case Xi and Mi are exports and imports, respectively. In a case where the index has an upper limit of 100 then there are no imports, and a lower limit of negative 100 symbolizes a lack of exports.

Mashabela (2008) explained that the Net Export Index has one challenge, that it does not consider the total level of trade in a product. Their argument implied that if a country that can produce sufficient amount of a product, export a marginal surplus, with zero imports; then the country would have a higher index of 100 and hence, it would seem to be very competitive, whereas it barely trades at all. Consequently, the study decided to adopt all three indices to analyze the competitiveness of the sugar industry in South Africa relative to the top ten global exporters of the product.

Trade potential index (TPI)

The Trade Potential Index is based on a scoring method relying on data attained from the Trade Map database to detect countries or commodities that have the potential to be exported. The trade indicators contained in the database were: *Did SA export to another*

country/? Are the exports by SA to the country growing? Are SA exports to the world growing? Are SA imports from the world growing? As well as the concentration of markets in the other country and tariffs imposed by that country to SA. The TPI concentrates on products or countries that have already traded together. The TPI is measured against a potential score of 4, since the indicative potential trade larger than R1 million is not available for the product examined. A score of 0 symbolizes the lowest end of the scale and the least trade potential, while a score of 4 indicates the highest trade potential (DAFF, 2014).

4.10 Summary

This chapter highlighted the research strategy and approach used to investigate the competitiveness of sugar industry in South Africa relative to the major exporters of the product. The study made use of three popular indices, which are denoted as (NXi), RCA# and the RTA. The RCA# and the (NXi) were applied as corresponding measurements to ensure that one model balances out any gap that exists in the other model. The RTA on the other hand was used alone as an alternative measurement to the two indices. The TPI was used to investigate market channels that could be exploited by South Africa to increase its export capacity of sugar.

CHAPTER 5: RESULTS AND DISCUSSIONS

5.1 Introduction

The aim of this chapter is to provide the chosen definition of competitiveness for this study as it will be vital for the discussion of the results of the competitive performance analysis of sugar industry in South Africa in relation to the top ten exporters of sugar. Also all indices discussed in the preceding chapter, namely; the RCA#, the NXi index and the RTA index, are used to determine the competitive status of the South African sugar industry relative to the sugar industries in the top ten exporting countries. The first two indices were applied concurrently to measure the revealed competitiveness of each country, mainly because Galleto (2003) commented that the NXi index overlooks the total level of trade of a product.

5.2 Definition confirmed

The methodology and techniques applied in the study made it necessary to define competitiveness analysis in order to direct the results of this study. Therefore, this study defined competitiveness as *"when an industry (sugar industry) is able to trade its commodities effectively in order to achieve sustainable commercial development within international conditions, while receiving at the opportunity cost of earnings on inputs used"* (Esterhuizen, 2006; Freebairn, 1986). The definition allows for an understandable method to be used to solve the problem of competitiveness and considers trade as the main component of the performance measurement.

5.3 Analysis of applied indices for countries considered

The results of all indices used in the study were explained. The first two indices were used simultaneously, and the RTA index was applied separately. This step was used to achieve the main research objective in the sugar industry in South Africa. After cautiously considering the different measurements that could be applied in the study, three popular indices, namely; RCA#, NXi and RTA were chosen, to provide accurate results of the competitiveness of the sugar industry in South Africa in the context of international environment.

The application of RCA#, NXI and RTA indices was necessary to measure the competitive performance based on trade. This is a quantitative method, which goes with an argument that competitive advantage can be shown by the trade status of traded single products, value chains and countries in a way that a product's trade pattern replicates relative market costs. Variation in non-price competitive aspects, i.e. subsidies, public support measures and government policies could also influence the trade performance of a country. The methods selected in this study allowed for the evaluation of competitiveness under real-world trade conditions and considered 'irregular economic playing fields' as a result of distortions in economic policies and varying trade systems (Esterhuizen, 2006). The RCA# and NXi indices were slight measurements of competitiveness of an industry that they concentrated on the comparative advantage side, and therefore, the RTA was the most suitable measurement for the competitiveness of an industry.

The above definition of competitiveness was supported by the adopted measurements, as an indicator of how competitive sugar industry in South Africa has performed. It was important to assess how effectively the industry traded its commodities domestically and in the international environment over time in relation to its competitors. The approach considered the overall trade performance.

5.4 Sugar RCA#, NXi and RTA indices

The three indices were applied to the top ten sugar exporting countries and South Africa was included for comparison, although South Africa does not form part of the top ten exporters of sugar. It is important to remember that when RCA# index is >1 it indicates a revealed comparative advantage, and when the RCA# index is <1 it indicates a revealed comparative disadvantage. Galleto (2003) alluded that if the RCA# index value is >10 for a commodity of a country, then that country has a strong competitive advantage for that product; and when an NXi index value is 100 it symbolizes that a country is a net exporter of a product with zero imports, while a lower limit of negative -ve100 means there are no exports.

RTA index was also used in this study, because it is believed that this index makes it possible to compare between countries, since it is a ratio that measures imports and exports of a country relative to what is exported or imported by other countries in relation to the commodity being examined. RTA index captures market biases and the dimension of the economy, and for this reason it is acceptable to compare the RTA between countries. Scott and Vollrath (1992) and Galleto and Cappellini (2003), agreed that a

positive RTA index indicated an international competitive advantage and vice versa, if RTA index was negative.

5.4.1 Index results for Brazil

Table 5.1 below shows the three indices that were applied to Brazilian sugar industry. Brazil is known for its high production capacity in the sugar industry more than any other country. The RCA# values for Brazilian sugar have been >10 for the whole period in consideration, which showed that Brazil has a stronger comparative advantage than any other country. According to Galleto (2003) and Winkelman *et al.* (1995), the Revealed Comparative Advantage (RCA) index is among the greatest common and operative methods of examining industrial competitive performance. The NXi indices were all close to 100, ranging between 95 and 99%, which showed that Brazil has been a net exporter possessing comparative advantage in the sugar industry throughout the years. The import values were very low indicating that Brazil produces sugar efficiently. According to Mashabela and Vink (2008), the NXi index is a comprehensive and greater measure of competitiveness, given the fact that it takes both imports and exports into account and it avoids double counting. The RTA values for Brazil were positive and higher than any other country throughout the period and therefore, it was concluded that Brazil has a global competitive advantage more than all countries in the sugar trade. The RTA index gives an allowance for the measurement of competitive performance under the actual world circumstances (Esterhuizen and Van Rooyen, 2006; Vollrath, 1991).

5.4.2 Graphical presentation of results for Brazil

The graphical presentation of Brazilian sugar trade indices is shown in **Figure 5.1** below. According to Brockwell and Davis (2002) when dealing with time series data it is vital to plot the series and examine the main features of the graph, taking into account whether there are trends or changes in behavior. The index values have fluctuated throughout the

period for all indices. The RCA# values were low with RTA values fluctuating drastically, but all were >10, which showed strong competitiveness of the country, and NXi indices were all close to 100. It was concluded that Brazil was very strong in production and trade of sugar.

Table 5.1: RCA#, NXi and RTA value for Brazil between 2001 and 2017

Years		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#		18.64	17.09	15.03	15.64	18.57	24.70	18.57	17.17	27.53	32.03	28.91	25.67
Years		2013	2014	2015	2016	2017	Avg						
RCA#		24.39	22.30	21.11	27.43	27.99	22.52						
Years		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi		97.22	97.90	98.44	98.35	98.80	99.07	98.48	97.99	98.97	99.05	98.96	98.20
Years		2013	2014	2015	2016	2017	Avg						
Nxi		98.13	97.91	97.73	98.72	98.67	98.39						
Years		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA		18.47	16.94	14.92	15.51	18.47	24.62	18.46	17.04	27.47	31.98	28.86	25.55
Years		2013	2014	2015	2016	2017	Avg						
RTA		24.27	22.18	20.94	27.31	27.86	22.40						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

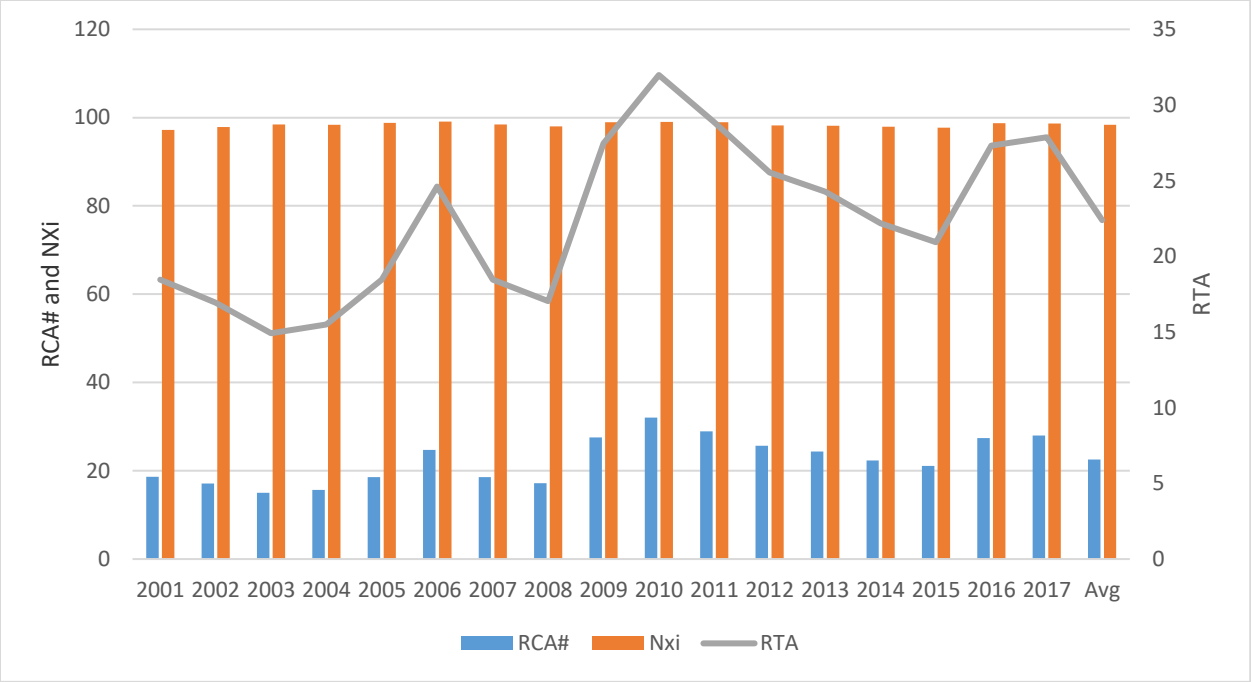

Figure 5.1: Graphical presentation of indices for Brazil

Source: Own based on ITC (2018)

5.4.3 Index results for Thailand

The results showed that Thailand was the second-best country in the trade of sugar (**Table 5.2 and Figure 5.2**). Thailand has a comparative advantage in the trade of sugar with RCA# values >1 but <10 compared with Brazil, which has all its RCA# values >10. The RCA# values for Thailand have also fluctuated between 2.79 in 2003 and 7.04 in 2012. That means Thailand might have a potential to reach RCA# levels of 10 in the future, thus enabling it to have a strong comparative advantage. **Table 5.2** shows that the NXi values for Thailand were high throughout the period in consideration ranging between 88 and 95 with an average of 90.86, which evidently showed that Thailand was a net exporter of sugar. When NXi values range around the values mentioned, it shows that the

country imports very little quantities of that product symbolizing that the country produces the product efficiently (comparative advantage) to meet its consumer demands. The RTA values for Thailand were all positive with an average RTA value of 4.75 showing that Thailand has a competitive advantage in sugar trade but lower than Brazil, which has the highest RTA values than any other country. The RTA index is the most accurate measure of competitive trade advantage of countries, and that is why it was used in this study.

5.4.4 Graphical presentation of results for Thailand

Figure 5.2 shows that Thailand had higher export values for the period considered, making it the second-best exporter of sugar after Brazil, which occupies the first place. All RCA# values for Thailand were positive with RTA values a bit higher but not exceeding the value of 7, and therefore, it was concluded that Thailand has a comparative and competitive advantage in sugar trade.

Table 5.2: RCA#, NXi and RTA value for Thailand between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA #	4.83	4.87	5.72	4.61	3.52	2.79	4.36	4.76	4.96	4.31	6.15	7.04
Years	2013	2014	2015	2016	2017	Avg						
RCA #	5.35	5.61	5.97	4.48	4.89	4.95						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	94.59	92.78	93.82	93.22	91.18	88.56	89.70	90.63	92.27	88.97	92.72	93.31
Years	2013	2014	2015	2016	2017	Avg						
Nxi	89.23	88.28	89.34	88.35	86.85	90.81						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	4.72	4.71	5.56	4.47	3.39	2.63	4.14	4.56	4.76	4.07	5.97	6.86
Years	2013	2014	2015	2016	2017	Avg						
RTA	5.11	5.31	5.66	4.21	4.58	4.75						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

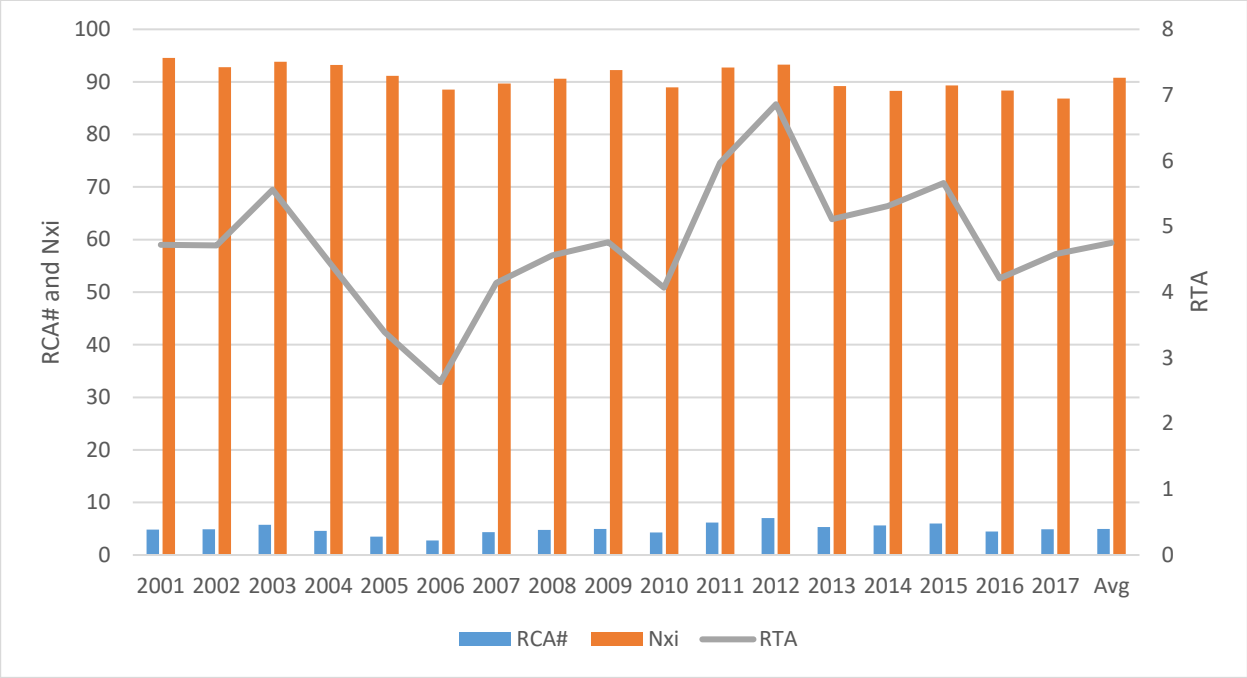

Figure 5.2: Graphical presentation of results for Thailand

Source: Own based on ITC (2018)

5.4.5 Index results for South Africa

South Africa was the country in observation in this study. It was compared with the top ten sugar exporting countries to determine its competitiveness as stated in the previous chapters. According Leishman, Menkhaus and Whipple (1999) the Balassa's export-based RCA index ignores features of local consumption and value added processing, but still can be regarded as a reliable gauge for measuring the relative strength and weakness of agricultural exports. If the RCA values are greater than one, then South Africa possesses a revealed comparative advantage in sugar (Galetto, 2003).

South Africa had positive RCA# values of <10 throughout the entire period of 17 years as shown on **Table 5.3.** There were fluctuations in the values, with highest values occurring in 2001. The average RCA# value for SA was 2.42, which was less than the averages of both Brazil and Thailand. On the other hand, the NXi values for South Africa were very low to a point where negative values were observed. However, in 2001 South Africa had a higher NXi value of 90, and ever since that year, the values have decreased sharply to negative values from 2011 to 2017, except for 2013/14 when the values were positive. One of the major contributors to the decline in the exports during the above stated period was the severe drought which was experienced by the country. This drought caused production of different commodities in the agricultural sector to decline sharply. The overall assessment showed that the average value of the NXi was positive at a value of 27.74 during the 17 years under observation, which confirmed that the South African sugar industry is not doing very badly in the international level. Balasa's (1989) theory suggests that positive NXi values prove a country to be exporting and therefore the average value of SA's NXi shows that the country has exports to other nations.

The RTA values for South Africa which were considered to be the most relevant results that could be relied on in this comparison were very low but positive from 2001 to 2010. From 2011, South Africa experienced negative RTA values until 2013 when the values became positive again, and from 2015 the values dipped again until 2017 (**Table 5.3**). Therefore, the overall RTA average for South Africa was positive, proving that the country has a competitive advantage in sugar production except for those years where the values were negative. The RTA average values showed that South Africa has a low competitive advantage of <10, which is the minimum measure that differentiates between countries

that have strong competitive advantage from those that have less competitive advantage. Therefore, with this comparison among the countries it can be concluded that South Africa has a lower competitive trade advantage compared with Brazil and Thailand, which were the most competitive countries in the sugar trade. The average RCA# and RTA values of South Africa are positive and above the value of 1.

Table 5.3: RCA#, NXi and RTA value for South Africa between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	5.08	4.17	3.32	2.80	2.85	3.12	2.18	1.65	2.66	1.98	1.35	1.55
Years	2013	2014	2015	2016	2017	Avg						
RCA#	2.14	2.37	1.09	1.15	1.69	2.42						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	90.16	82.69	69.41	50.63	57.87	62.10	39.52	25.22	49.37	10.97	-4.02	-4.58
Years	2013	2014	2015	2016	2017	Avg						
Nxi	1.26	12.19	-20.58	-28.03	-22.68	27.74						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	4.86	3.85	2.82	2.08	2.25	2.57	1.47	0.85	1.92	0.40	-0.10	-0.02
Years	2013	2014	2015	2016	2017	Avg						
RTA	0.25	0.76	-0.34	-0.89	-1.05	1.27						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

Figure 5.3 below show that South Africa had high exports values and a high competitive advantage in 2001, but both indices declined towards 2004; with a slight pick up from 2004 to 2006, followed by severe decline up to 2017. South Africa faces a competitive

disadvantage symbolized by the negative values. However, the RCA# values for South Africa were positive just above 1, confirming that South Africa has a bit of comparative advantage in the production of sugar. Therefore, it was concluded that, South Africa was much less competitive compared with Brazil and Thailand.

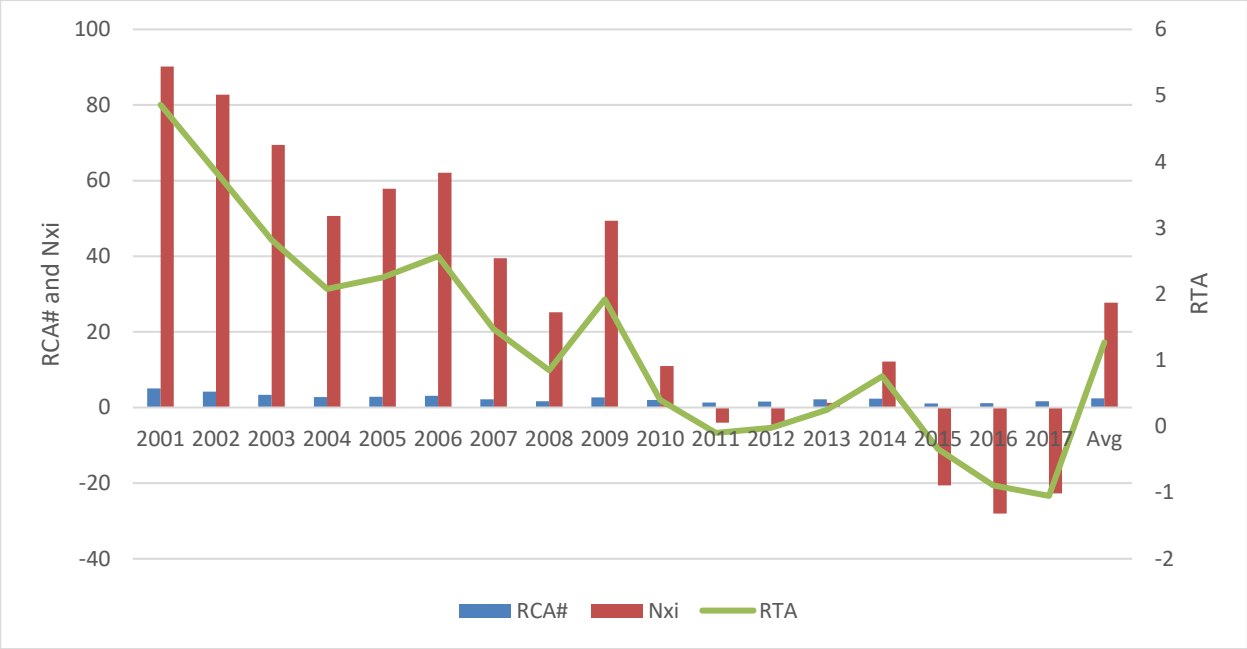

Figure 5.3: graphical presentation of South Africa's indices

Source: Own based on ITC (2018)

5.4.6 Index results for France

The index values for France sugar industry are presented in **Table 5.4** below. The RCA# values for France were low with a highest value of 2.46 in 2002 above the average value of 2.05. However, France had positive values for the whole period of 17 years, confirming that the country has a comparative advantage in sugar production even though it is not very strong. The NXi values for France ranged between 35 and 53, with an average of 42.84, which was even better than 27.74 for South Africa. France had better NXi values than South Africa for most of the years examined, except for a few years when South

Africa did better. The NXi results confirmed that France exported more than it imported, making it a net exporter of sugar. On the other hand, the RTA values for France were all positive values less <2 but >1. France had a competitive trade advantage in the sugar industry with an average of 1.39, which was slightly higher than the value for South Africa but lower than the values for Brazil and Thailand.

Table 5.4: RCA#, NXi and RTA values for France between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA #	2.22	2.46	2.42	2.47	2.32	2.20	2.32	2.33	2.03	1.65	1.77	1.95
Years	2013	2014	2015	2016	2017	Avg						
RCA #	1.87	1.87	1.77	1.52	1.76	2.05						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	52.35	49.20	48.62	44.69	43.37	46.81	37.94	39.13	42.12	42.32	43.27	45.84
Years	2013	2014	2015	2016	2017	Avg						
Nxi	40.80	37.69	39.27	35.50	39.35	42.84						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	1.63	1.73	1.70	1.68	1.59	1.52	1.50	1.54	1.36	1.11	1.26	1.39
Years	2013	2014	2015	2016	2017	Avg						
RTA	1.24	1.21	1.13	0.92	1.16	1.39						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

Indices for France showed that the country had a comparative advantage in the sugar industry with an average RCA# less than that of South Africa and export NXi values greater than those of South Africa (**Figure 5.4**). The competitive advantage of France was slightly above that of South Africa; which means that France had a bit of competitive advantage compared with South Africa.

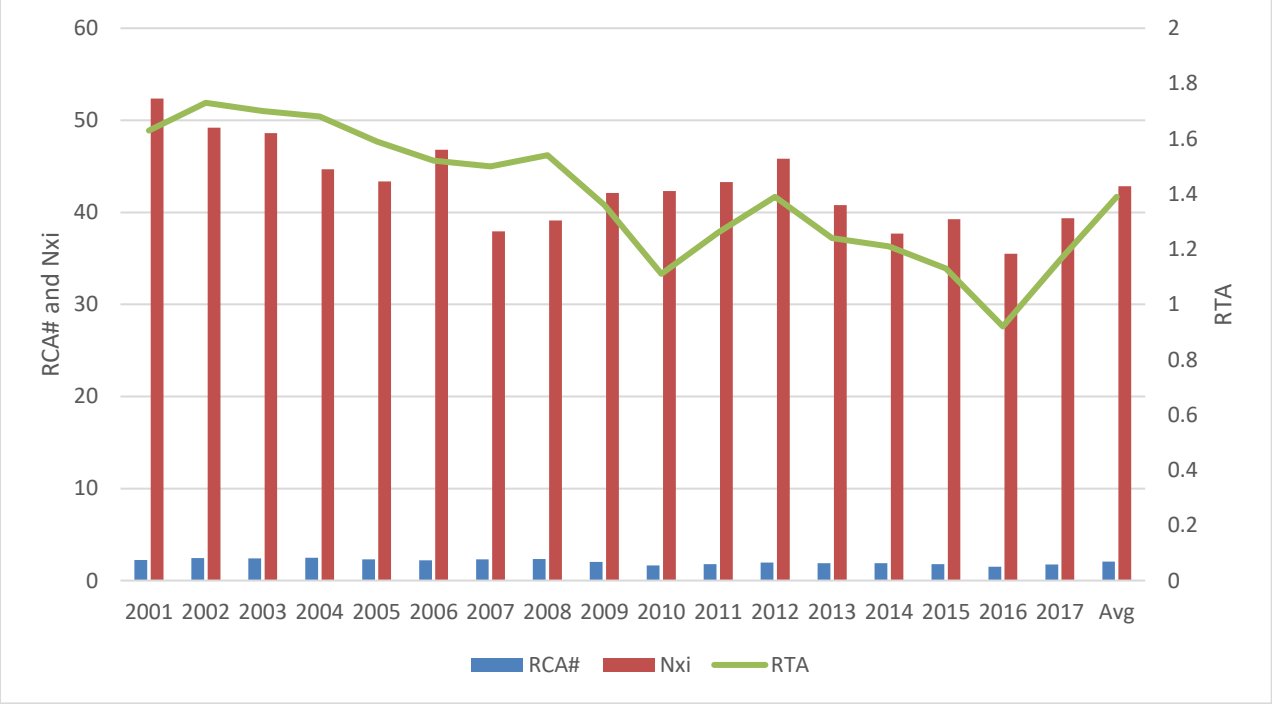

Figure 5.4: Graphical presentation of results for France

Source: Own calculations based on ITC (2018)

5.4.7 Index results for Mexico

Mexico had positive RCA# values ranging between 0 and 2, which showed that it did not produce high quantities of sugar in the years examined, as symbolized by low RCA# values of <1 in some years (**Table 5.5**). The average RCA# value for the period

considered for Mexico was >1 but <10 confirming that the country had an overall comparative advantage in sugar production. The NXi values for Mexico were generally low, with the highest value of 43.68 and an average of 25.16. It clearly showed the sugar trade was characterized by both exports and imports of sugar. The very low NXi values for Mexican sugar in some years showed that the country had very little exports of the product. On the other hand, the RTA values for Mexico were positive, but for most of the years at the value of <1. Positive RTA values showed that Mexico had a competitive advantage in the production or trade of sugar. The RTA average for Mexican sugar was 0.60, meaning that the country had a competitive trade advantage but not sufficient enough to surpass most of countries including South Africa.

Table 5.5: RCA#, NXi and RTA values for Mexico between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.64	0.86	0.72	0.86	1.13	1.41	0.99	1.63	1.69	1.45	1.80	1.36
Years	2013	2014	2015	2016	2017	Avg						
RCA#	2.02	1.78	1.70	1.45	1.49	1.35						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	16.19	43.68	23.64	17.17	37.75	26.84	4.75	30.87	20.83	12.01	23.18	6.84
Years	2013	2014	2015	2016	2017	Avg						
Nxi	34.43	36.57	31.82	31.95	29.16	25.16						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	0.24	0.56	0.32	0.31	0.68	0.63	0.17	0.86	0.62	0.33	0.77	0.21
Years	2013	2014	2015	2016	2017	Avg						
RTA	1.07	1.01	0.89	0.75	0.75	0.60						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

The index results for Mexico have shown that the sugar industry has fluctuated over the years (**Figure 5.5**), but it had since improved to a level where the RCA# was >1. The exports from Mexico have not been significant throughout the period. Despite that Mexico remained a net exporter of sugar. In terms of competitive advantage, Mexico had RTA values of <1, which confirmed a competitive disadvantage except for two years (2013 and 2014). Therefore, it was concluded that Mexico has a competitive disadvantage in its sugar industry.

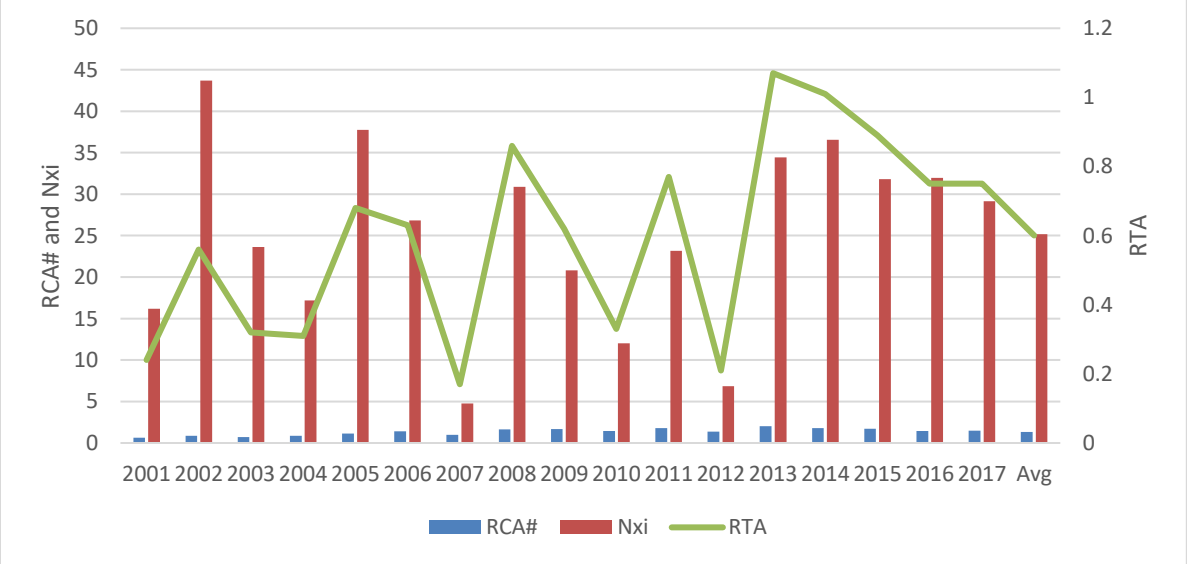

Figure 5.5: Graphical presentation of results for Mexico

Source: Own based on ITC (2018)

5.4.8 Index results for Belgium

Belgium has a comparative advantage in sugar production as shown by the RCA# values of >1 but <2, except 2011 when the RCA# value was <1 (**Table 5.6)**, which showed that the comparative advantage of Belgium was not very strong. For a country to be regarded as having a strong comparative advantage the value of the RCA# must be >10. Belgium also had very low NXi values, with a negative value in 2001, which proved that Belgium had almost the same quantity of exports and imports of sugar. The RTA values for Belgium were positive for almost the entire period of 17 years, except 2001 when the value was negative. The positive values of >0 and an average of 0.24 showed that Belgium had a global competitive advantage in sugar trade. However, the competitive trade advantage for Belgium was less than that of Brazil, Thailand, South Africa and Mexico.

Table 5.6: RCA#, NXi and RTA values for Belgium between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	1.72	1.64	1.74	1.68	1.86	1.84	1.46	1.33	1.09	1.04	0.89	1.07
Years	2013	2014	2015	2016	2017	Avg						
RCA#	1.02	1.17	1.17	1.10	1.18	1.35						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	-1.19	3.56	11.58	13.18	1.40	18.67	24.44	15.62	8.86	16.63	8.37	6.59
Years	2013	2014	2015	2016	2017	Avg						
Nxi	3.58	8.18	19.68	12.71	8.36	10.60						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012

RTA	-0.04	0.07	0.34	0.38	0.07	0.55	0.59	0.39	0.14	0.27	0.17	0.14
Years	2013	2014	2015	2016	2017	Avg						
RTA	0.04	0.18	0.35	0.20	0.18	0.24						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

The graphical interpretation results for Belgium is shown in Figure 5.6 below. The RCA# values for Belgium were positive extending between 1 and 2, which confirmed that the country has a comparative advantage in the production of sugar. There were serious fluctuations in the NXi values, except for 2007 when exports were highest and achieved the value of 24. However, Belgium was a net exporter of sugar with positive NXi values except for 2001 when the NXi value was negative. On the other hand, the RTA values showed that Belgium lacks competitive advantage in the sugar industry. All values for the years under review were <1, and the overall average was <1, which showed a competitive advantage in the industry.

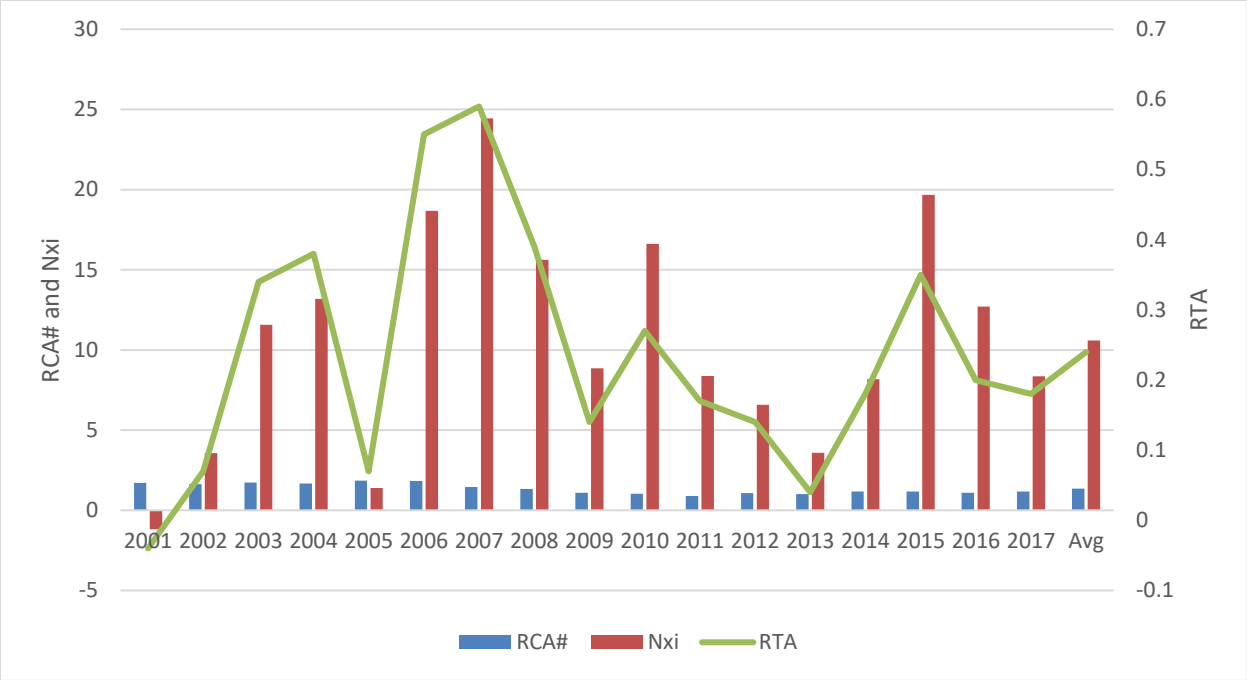

Figure 5.6: Graphical presentation of results for Belgium

Source: Own based on ITC (2018)

5.4.9 Index results for the Netherlands

The RCA# values of the Netherlands were low ranging between 0.5 and 1.3 as shown in **Table 5.7** below. These values mean that the Netherlands had a comparative disadvantage in some years symbolized by values of <1. The country had a comparative disadvantage from 2009 to 2012, and thereafter, the values were >1, with an overall RCA# average of 1.04, which was slightly above the standard measure of 1. The NXi values for the Netherlands were low throughout the period with a maximum value of 27.50, which was much lower than Brazil. It was concluded that the Netherlands was a net exporter of sugar even though the exports were not very high. The RTA values were all below the value of 1, but positive throughout. These values implied that the

Netherlands had a competitive trade advantage in the sugar industry, although that was not strong enough to compete with other markets.

Table 5.7: RCA#, NXi and RTA values for Netherlands between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.85	1.00	1.18	1.23	1.15	1.07	1.27	1.13	0.91	0.79	0.82	0.99
Years	2013	2014	2015	2016	2017	Avg						
RCA#	1.00	1.15	1.10	1.00	1.04	1.04						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	22.54	21.29	27.09	27.50	23.82	27.35	25.53	15.72	19.72	23.72	8.84	19.49
Years	2013	2014	2015	2016	2017	Avg						
Nxi	19.61	21.55	19.33	21.75	26.03	21.82						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	0.30	0.31	0.47	0.50	0.41	0.40	0.47	0.26	0.23	0.25	0.12	0.28
Years	2013	2014	2015	2016	2017	Avg						
RTA	0.25	0.34	0.29	0.28	0.39	0.33						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

The Netherlands appears in the top 10 sugar exporting countries with RTA values of <1 but positive for the entire period as shown in **Figure 5.7**. The RTA values of <1 for the Netherlands mean that the country has a global competitive disadvantage and comparative disadvantage in its sugar industry. Despite that, the Netherlands was a net exporter of sugar, with positive NXi values 5.

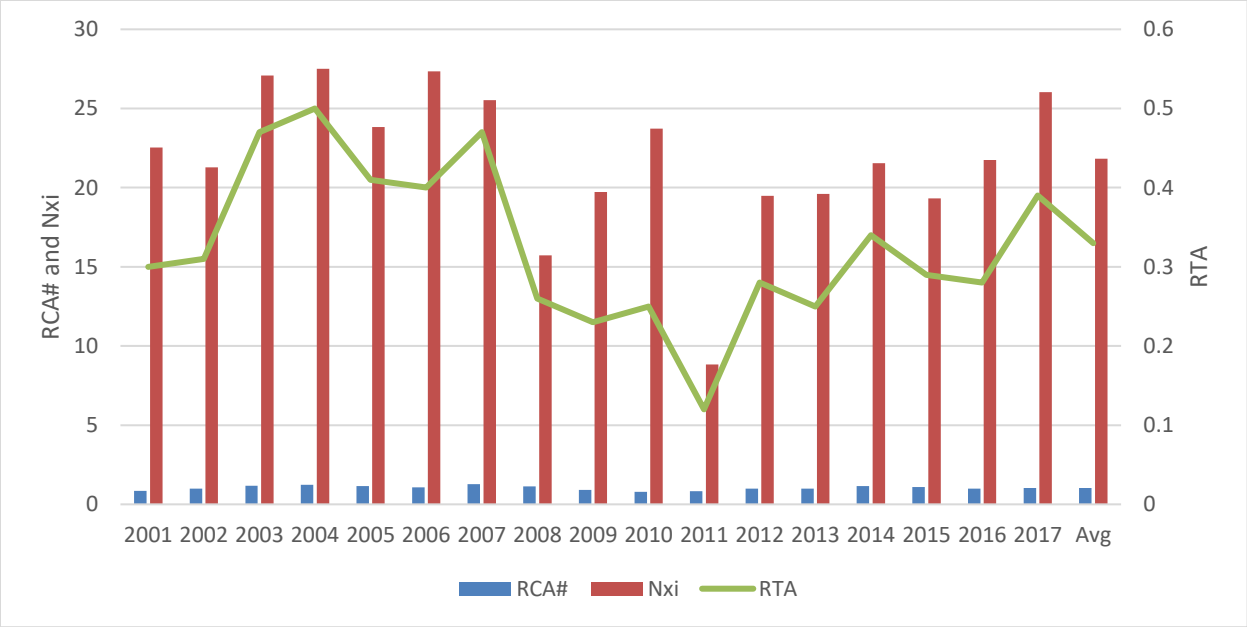

Figure 5.7: Graphical presentation of results for Netherlands index

Source: Own based on ITC (2018)

5.4.10 Index results for Canada

Canada was not a very good producer of sugar before 2017 and it was not among the top ten exporters of sugar as shown in **Table 5.8** below. Initially this study was conducted until 2016 due to the unavailability of data for 2017, and India was put among the top exporters of sugar in the place of Canada. Canada had low RCA# values but positive index values of <1 for the entire period. Low values of <1 show that the country has a comparative disadvantage in the sugar industry, it doesn't produce efficiently. This was also supported by the NXi values, which were negative for most of the years, until it became clear that the Canadian sugar industry was not globally competitive. The NXi values for Canada were <0 since 2001 and in 2003-2005 they became positive but with lower values, and again after three years they became negative. The negative values

experienced by Canada showed that the country was a net importer of sugar. The RTA values for Canada over the period of 17 years moved in the same direction as the NXi values with negative RTA values for approximately 7 years. The total average value of RTA values were also negative, showing that the country experienced a competitive trade disadvantage in its sugar industry. The RTA value of -0.14 was the lowest value compared with all the other countries, and Canada was the only country with a negative RTA value thus far, meaning that it did not compete enough in the global markets.

Table 5.8: RCA#, NXi and RTA values for Canada between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.63	0.70	0.90	0.86	0.79	0.74	0.82	0.87	0.80	0.72	0.66	0.70
Years	2013	2014	2015	2016	2017	Avg						
RCA#	0.73	0.79	0.93	0.85	0.85	0.78						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	-11.43	-5.85	0.89	2.61	0.83	-5.85	-1.01	-2.70	-10.53	-12.55	-20.79	-14.94
Years	2013	2014	2015	2016	2017	Avg						
Nxi	10.19	10.31	-2.24	-9.03	-9.12	-7.19						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	-0.25	-0.15	-0.05	-0.04	-0.05	-0.19	-0.06	-0.12	-0.17	-0.20	-0.30	-0.21
Years	2013	2014	2015	2016	2017	Avg						
RTA	-0.15	-0.18	0.00	-0.13	-0.10	-0.14						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0 Global competitive advantage; RTA<0 Global competitive disadvantage, "+" positive trend; "-" negative trend; and "=" constant trend

Figure 5.8 below shows that Canada has a global competitive disadvantage in the trade of sugar. The RTA values of the country were considered to be negative throughout the years, indicating a negative trend in the trade of sugar. Therefore, it was concluded that Canada was not an efficient producer of sugar, since the RCA# values were <1 and NXi values were negative for the entire period under review. That means Canada has a comparative disadvantage in sugar production, and it is a net importer of sugar.

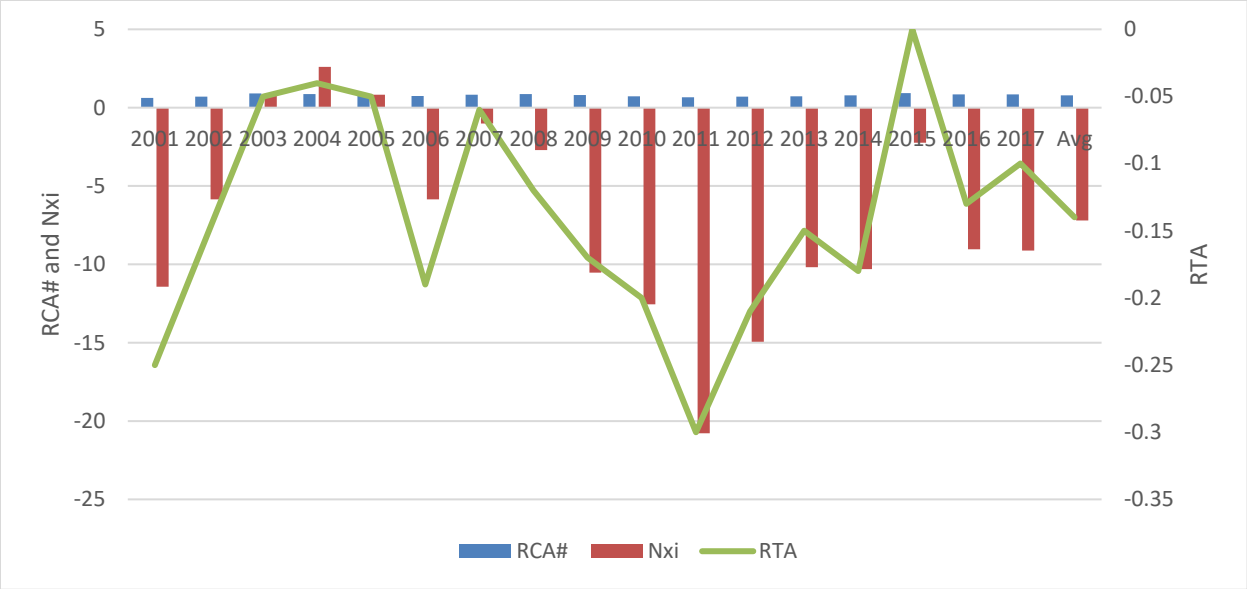

Figure 5.8: Graphical presentation of results for Canada

Source: Own based on ITC (2018)

5.4.11 Index results for Germany

Germany was among the top three exporting countries on ITC database in recent years, but that changed since 2016. The RCA# values for Germany were below the minimum measure of comparative advantage of 1, which means that Germany had a comparative disadvantage in sugar production for the entire period under review as shown in **Table 5.9** below. The highest RCA# value was 0.68, which is not too far from the standard measure of 1. The highest NXi value for Germany was 16.77, which could be considered as a competitive value for exports. The NXi index states that if a country has an NXi value of 100 it means that country does not import the commodity and if it has an NXi value of (-ve)100 then that country does not export either. In the case of Germany with NXi values ranging between -2.13 and 16.77 with most values being positive and above 1, it means

Germany has been a net exporter of sugar. However, the positive average NXi value of 7.48 showed that Germany exported very low quantities sugar during that period.

The RTA values for Germany fluctuated throughout the years with very small quantities of almost 0 for the entire period in question, and for about 7 years the RTA values were negative (**Table 5.9**). The highest RTA value for Germany was 0.15 in 2001 with an overall average of (-ve)0.02, which showed that Germany had a competitive trade disadvantage in the sugar industry. Its competitiveness could not be compared with those countries whose overall RTA value was positive above 1, such as Brazil, Thailand and South Africa. Therefore, it was concluded that Germany does not produce sugar efficiently compared with the other competitors.

Table 5.9: RCA#, NXi and RTA values for Germany between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.66	0.62	0.61	0.61	0.68	0.56	0.55	0.59	0.60	0.51	0.50	0.59
Years	2013	2014	2015	2016	2017	Avg						
RCA#	0.61	0.67	0.59	0.56	0.65	0.60						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	16.77	10.59	3.41	-0.17	5.92	6.79	2.69	-2.13	5.82	10.78	8.85	8.98
Years	2013	2014	2015	2016	2017	Avg						
Nxi	6.68	9.33	5.28	11.28	16.22	7.48						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	0.15	0.02	-0.07	-0.15	-0.04	-0.04	-0.08	-0.15	-0.05	0.02	0.03	0.00
Years	2013	2014	2015	2016	2017	Avg						
RTA	-0.04	0.01	-0.07	-0.01	0.10	-0.02						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

The results in **Figure 5.9** have shown that Germany sugar industry has no comparative advantage in the production sector, because of the low NXi values which were negative for some of the years. The RTA values for Germany were negative for most of the years examined, thus confirming that Germany had a negative trend in the global sugar trade. It was concluded that Germany did not produce sugar efficiently and it did not compete successfully with its competitors in the sugar trade.

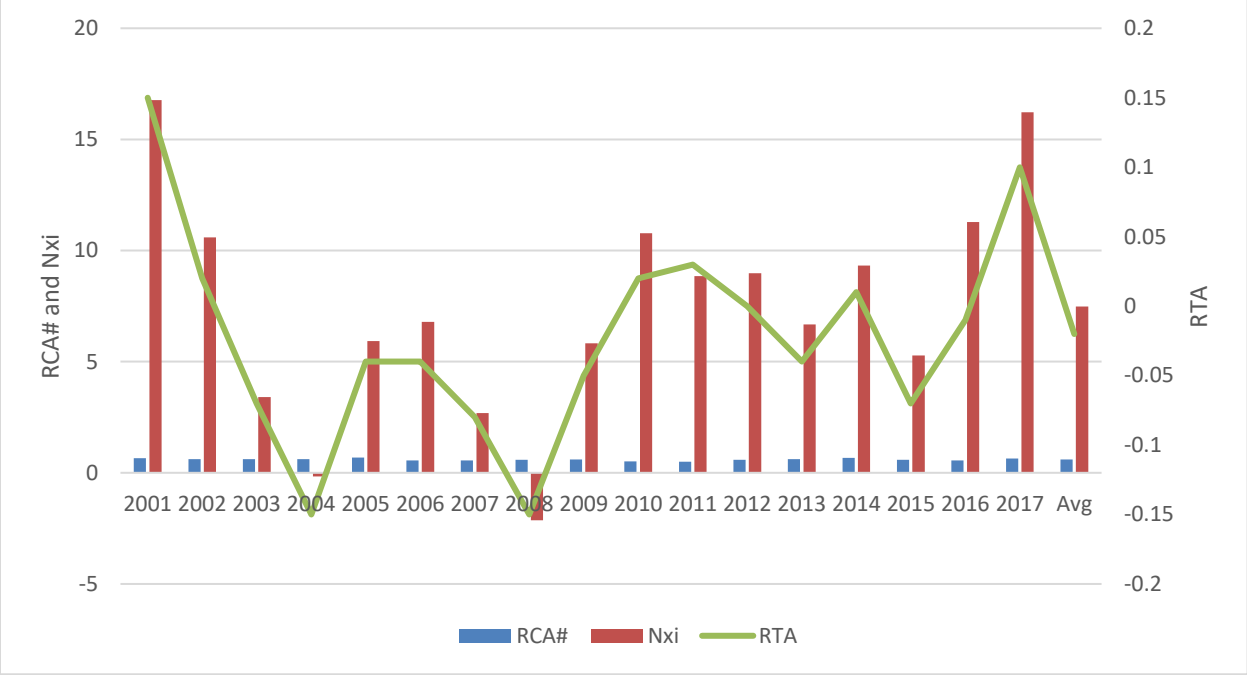

Figure 5.9: Graphical presentation of results for Germany

Source: Own based on ITC (2018)

5.4.12 Index results for United States of America

The United States of America is known as one of the countries with high production for most agricultural products that are traded globally. **Table 5.10** below shows sugar trade indices for the United States of America. The sugar industry in the USA was among the top five producers worldwide in recent years, but the country had high internal consumption of sugar, which escalated the importation of sugar from other countries. The RCA# values for the USA were all below 1 for the whole period, showing that the country has a comparative disadvantage in the production of sugar. The NXi values for the USA were also very low and negative throughout the period examined, which showed that the USA was a net importer of sugar (**Table 5.10**). Quantities of sugar exported by the USA were much lower than what was imported. The RTA values were negative for the whole period of 17 years. The negative RTA values demonstrated that the USA had a competitive trade disadvantage in the sugar industry. The country obtained most of its sugar from other countries, because it could not produce sufficient amounts for local consumption. It was concluded that the USA could not compete with the other countries that were considered in the study in terms of global trade competitiveness.

Table 5.10: RCA#, NXi and RTA values for the USA between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.34	0.33	0.37	0.39	0.38	0.39	0.52	0.46	0.38	0.44	0.47	0.55
Years	2013	2014	2015	2016	2017	Avg						
RCA#	0.55	0.54	0.51	0.44	0.47	0.44						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	-35.91	-48.34	-49.78	-48.52	-50.58	-49.72	-30.83	-39.66	-43.38	-38.71	-39.22	-28.01
Years	2013	2014	2015	2016	2017	Avg						
Nxi	-23.39	-29.31	-36.38	-38.27	-35.64	-39.16						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	-0.08	-0.18	-0.20	-0.17	-0.17	-0.23	-0.01	-0.16	-0.26	-0.21	-0.20	-0.07
Years	2013	2014	2015	2016	2017	Avg						
RTA	-0.04	-0.10	-0.19	-0.18	-0.13	-0.15						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

The USA was once known as the best producer and trader of sugar for many years, but the results of the current study stated otherwise (**Figure 5.10**). The RCA# values were all <1 and NXi values were negative for the entire period considered. The negative NXi values could be a result of high domestic consumer demands sugar in the USA. The RTA values were also very small for the whole period, symbolizing that the USA had a global competitive disadvantage in the trade of sugar.

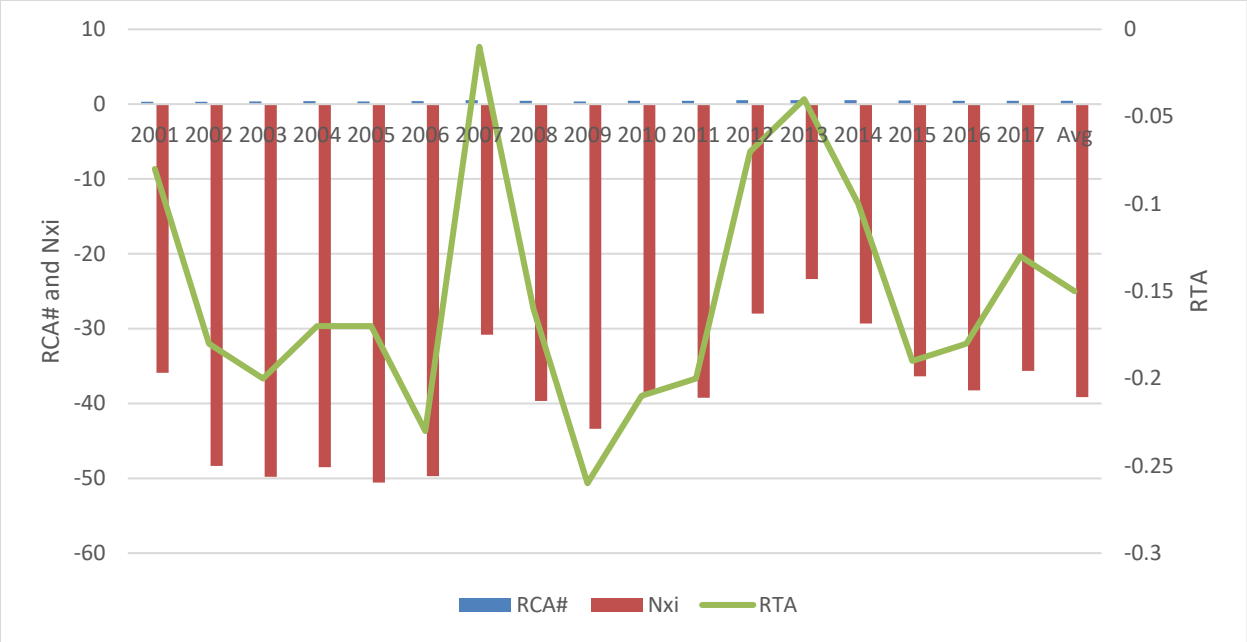

Figure 5.10: Graphical presentation of results for the USA

Source: Own based on ITC (2018)

5.4.13 Index results for China

China is known for its ability to produce most consumer products that are traded globally very proficiently, and it appears among the top exporters of numerous products that are traded globally, except for the sugar industry, which China did not produce efficiently as shown in **Table 5.11** below. China had the lowest RCA# values of <1 among all the countries examined, which showed that China had a comparative disadvantage in its sugar industry. China also imports most of its sugar more than it exports, this is shown by the negative NXi values in **Table 5.11.** The NXi values were positive but still very low values for a period of 6 years, with an overall average which was negative. This confirmed that China was a net importer of sugar. Refer to page 88 table 5.1 positive values from 2008-2009 and 2017. The RTA values were all <1, with a negative average of -0.09.

Therefore, it was concluded that China had a competitive trade disadvantage in the sugar industry.

Table 5.11: RCA#, NXi and RTA values for China between 2001 and 2017

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RCA#	0.21	0.26	0.18	0.18	0.22	0.18	0.20	0.21	0.21	0.21	0.21	0.19
Years	2013	2014	2015	2016	2017	Avg						
RCA#	0.22	0.24	0.25	0.26	0.26	0.22						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nxi	-41.49	-10.41	-4.71	-14.27	-3.90	-14.38	7.62	22.95	23.57	1.23	-24.61	-33.56
Years	2013	2014	2015	2016	2017	Avg						
Nxi	-23.90	-7.39	-14.21	7.79	11.15	-6.97						
Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RTA	-0.32	-0.08	-0.02	-0.06	-0.04	-0.12	-0.01	0.05	0.05	-0.03	-0.15	-0.25
Years	2013	2014	2015	2016	2017	Avg						
RTA	-0.19	-0.09	-0.22	-0.04	0.01	-0.09						

Source: Own calculation based on data from ITC (2018)

Notes: RTA>0□Global competitive advantage; RTA<0□Global competitive disadvantage, "+"□ positive trend; "-"□ negative trend; and "="□ constant trend

China's index results show that the country's RCA# values are very small all close to zero, with a highest of only 0.26, thus showing that China has a very severe comparative disadvantage in the production of sugar. The NXi values are also below 0 making them negative for majority of the years with an overall negative average, therefore it can be seen that China is a net importer of the product. These two statements above are

supported by the RTA values of China, which are all negative showing a global competitive disadvantage of the country in the sugar industry.

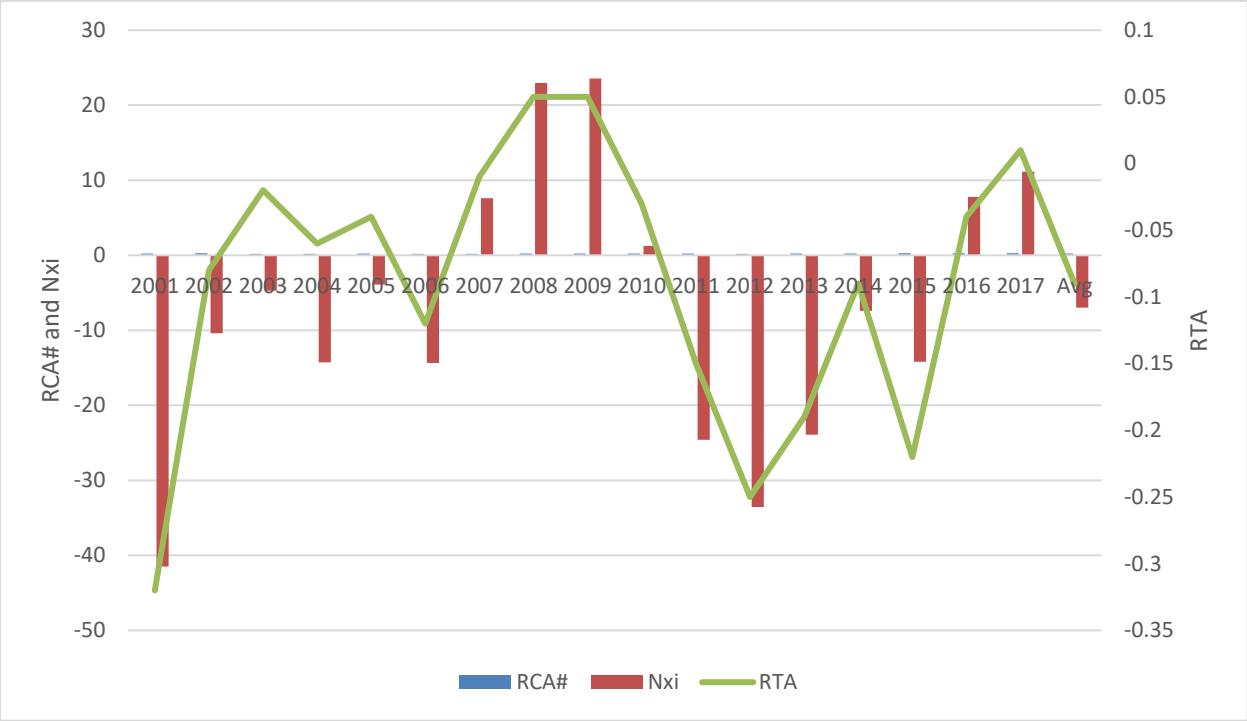

Figure 5.11: Graphical presentation of results for China

Source: Own based on ITC (2018)

5.5 Comparison of competitive status of countries with regard to RTA index

The main purpose of this study was to evaluate the competitive status of the sugar industry in South Africa globally. The overall results of the competitive performance of the sugar industry in South Africa measured by the RCA#, NXi and RTA indices, in comparison with other major sugar trading economies were discussed in previous sections. Below are results that reflect the RTA index, which was the main measurement of competitiveness among countries. The analysis gives an overview of how South Africa was ranked in the global environment. As stated in the previous sections, the RTA index

allowed for the comparison between countries, since it was a ratio of imports against exports of a country in comparison with global exports or imports of sugar in this case.

As reflected in **Figure 5.12** below, Brazil had the most competitive trade advantage over any other country throughout the period of 17 years (2001 to 2016). Brazil produced very large quantities of sugar and had a huge share in the global market of sugar. Thailand was the second country in the trade competitiveness of sugar, followed by South Africa until 2006, when the trade competitiveness for South Africa declined and reached negative in 2016/2017. From 2015, the RTA values for South Africa declined sharply into negative values, which confirmed that South Africa had entered a competitive trade disadvantage in global sugar trade. The inconsistency of South Africa's sugar industry resulted in France and Mexico overtaking South Africa from 2010 to 2017. Therefore, it was concluded that South Africa had a competitive trade disadvantage worse than all the top 10 countries analyzed between 2016 and 2017.

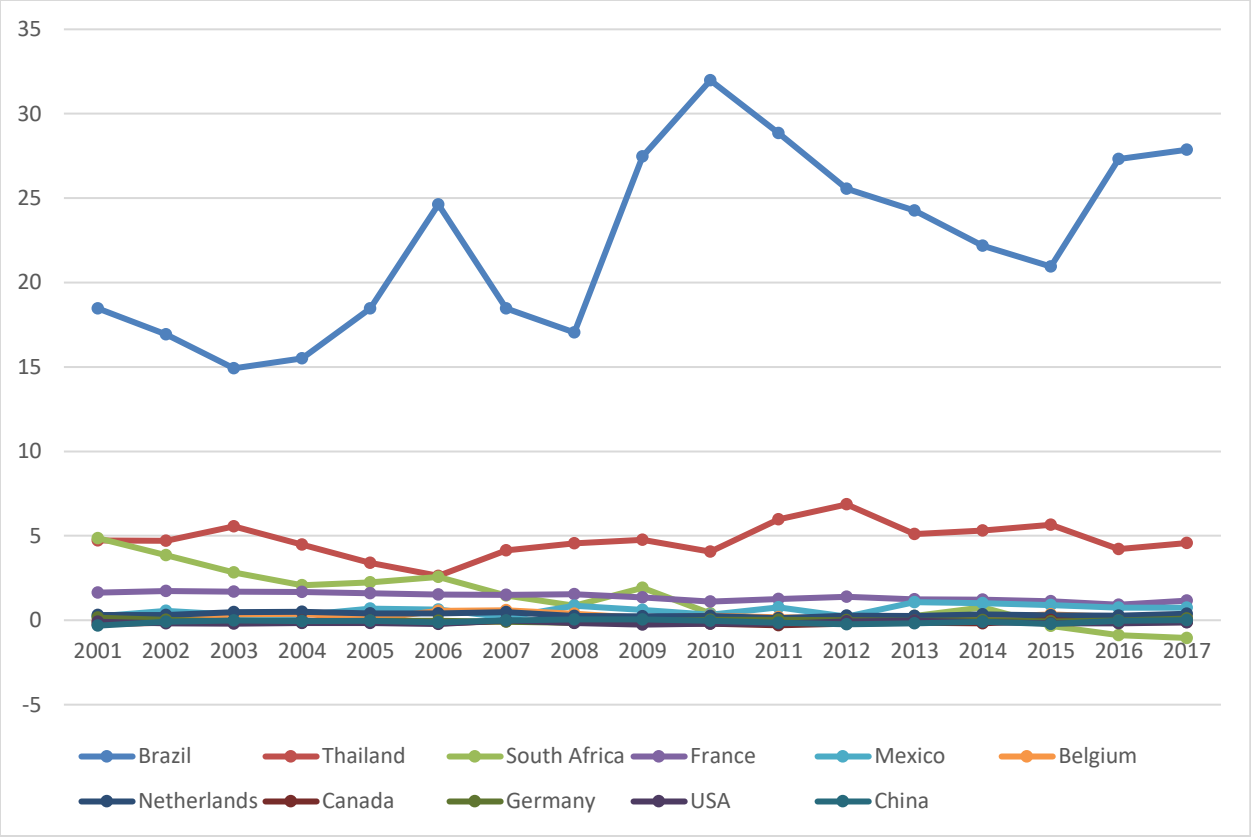

Figure 5.12: Overall international competitiveness

Source: Own calculation based on data from ITC (2018)

5.6 Potential markets for South Africa

The previous analyses recognised that the sugar exports from South Africa were competitive in the international market. However, most of prevailing export markets were concentrated, which forced South Africa to reassess the scope to increase its market share in global markets and to establish potential markets that were not highly concentrated. The study adapted the Trade Potential Index using the International Trade Centre (ITC) to explore some potential markets for South African sugar exports.

Table 5.12 below highlights the major markets that South Africa could exploit to increase its sugar exports. The Trade Potential Index was used to calculate the potential levels of all countries that import sugar from South Africa. The scores of most countries proved that South Africa did not have much potential for export to these countries. The markets in the **Table 5.12** have a growing import demand of sugar and the concentration of markets exporting to these countries was not intense. The tariffs imposed by the countries listed in **Table 5.12** on SA exports were low compared with most other countries, e.g. Lesotho imposed zero tariffs due to SACU trade agreements between the countries, because they are both members of the trade bloc. The distance between South Africa and these countries favoured exports, since these countries are mostly situated in Africa, except for the USA.

Table 5.12: Sugar trade potential index for South Africa

Importers	**Did SA export to the country**	**Are the export by SA to the country growing**	**Are SA exports to the world growing**	**Are SA imports from the world growing**	**Concentration of markets**	**Tariffs imposed**	**Total TPI Score**
United States of America	1	1	0	1	0.14	9.2	3
Lesotho	1	1	0	1	1	0	3
Democratic Republic of Congo	1	1	0	1	0.3	17.8	3
Malawi	1	1	0	1	0.28	14.2	3
Egypt	1	1	0	1	0.33	21.7	3

5.7 Summary

The purpose of this chapter was to determine the comparative and competitive status of South African sugar industry relative to its competitors using RCA#, NX_i and RTA indices. The results indicated that South Africa had a normal revealed competitive trade advantage of sugar than most of the competing countries for some years. Brazil was the only country with a very strong RTA, followed by Thailand which had a normal RTA close to that of South Africa. However, the competitiveness of the South Africa declined with the years from 2001 which was the highest downwards to negative values in 2017. Countries like China and the United States of America, which were previously known for their high production capabilities in most industries, had competitive disadvantages in the sugar industry and became net importer for most of the years. These two countries are famous of being overcrowded and this could be a major cause to the low exports as they utilise majority of their production for local consumption.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The main purpose of this study was to evaluate the competitiveness of the South African sugar industry in the global market. Different analytical indices were employed to ensure that research questions are answered, and the study objectives were achieved. This chapter aims at providing a summary of the findings that were obtained in chapter 5, and to recommend possible strategies that could be used to enhance the productivity of the sugar industry in South Africa. The following objectives and research questions were formulated in chapter 1:

6.2 Answering the research objectives and research questions with a summary of the results

The overall objective of the study was to evaluate and compare the South African sugar industry competitiveness with its competitors, with a view of investigating supplementary strategies which could be adopted to improve the performance of the sugar industry.

6.2.1 Specific objectives

- To define the competitive performance of South African sugar industry;
- To measure the competitiveness of the South African sugar industry;
- To explore new marketing channels that could boost for South African sugar exports; and,
- To identify possible strategies that could promote the level of competitiveness of the sugar industry.

Attainment of the above objectives depend on answering the research question, which was mentioned in chapter one, as "*what is the position of the South African sugar industry's competitive status relative to the top ten sugar exporting countries"?*

The research objectives together with the research question were important in guiding the whole study. Different indices were used in the study to ensure that the objectives were met. All the indices were explained in chapter four and how they were applied, including their strengths and weaknesses. Literature on global sugar industries was reviewed to ensure that the comparison made sense. Time series data was gathered for the study from reputable data sources and analysed using excel spreadsheet. The three indices, namely; RCA#, NXi and RTA, together with the Trade Potential Index (TPI) were used to calculate the trade competitiveness of several countries, to determine potential markets that could be exploited to increase the South African sugar exports in the future.

6.2.2 Summary of research findings

The results presented in chapter five proved that South Africa had a competitive trade advantage than most of the competitors, however, Brazil had the strongest competitive advantage than any other country, with all the values >10, which was the standard measure of strong competitiveness among the countries. Thailand had the second-best competitive advantage after Brazil, however, the difference in RTA values between Brazil and Thailand were huge. The RTA values for Brazil were all >10, while the RTA values for Thailand ranged below 10 but above 5. France occupied the third position in the

international market for sugar trade with RTA values ranging between 1 and 2. Fluctuations in the South African sugar industry caused the country to lose its competitiveness status and took the fourth place in competitive performance. The RTA values for South Africa were high from 2001 to 2006, but thereafter the positive values decelerated to negative values from 2011 to 2017.

All the remaining countries had comparative disadvantages in sugar trade, with RTA values of <1 for the entire period. Some countries such as Canada, Germany, USA and China had extreme competitive disadvantages, which were symbolised by negative RTA values for most of years. Mexico, Netherlands and Belgium on the other hand, had RTA values below 1 but above 0, which meant that their competitive disadvantages were not too high.

The evidence provided in chapter 5 attests to the fact that, the worldwide sugar industry was not sufficiently competitive, because most of the countries in the top ten list of exporters did not have revealed competitive advantage in the sugar industry. Brazil was the only country that showed consistency in maintaining very strong competitiveness in the industry, with very low imports of sugar from elsewhere in the world. Thailand and France maintained their revealed competitiveness in their sugar industries, with France experiencing a competitive disadvantage only in 2013, when there was a slight shortfall of 0.08. India used to be amongst the top 10 exporters of sugar, but recent data (2017) showed that the country did not appear on the top list of exporters for the product anymore. India fell off from the list of top exporters of sugar recently probably due to higher population increase, which increased domestic consumption. South Africa was

competitive globally in the early 2000s with RTA values of >2 until 2010, then the values declined to negative from 2011 to 2017.

The results also identified some countries where South Africa could increase its exports. These were countries with strong TPI due to the increase in imported annual quantities (**Table 5.12**). There were many other countries that South Africa could exploit by exporting more sugar to them, but the countries on **Table 5.12** above were the countries that showed very strong potential for increases in South Africa sugar exports. Tariffs experienced by South Africa in these countries were reasonable and there were very few other countries exporting to these markets.

The hypothesis for this study was that, *"the sugar industry in South Africa is not competitive against its rival countries".* The results have proved that South Africa has more competitive trade advantage than most of the top ten exporters of sugar. The country's competitive performance was surpassed only by Brazil, Thailand and France which were the strongest sugar traders. The remaining seven countries, namely; Mexico, Belgium, Netherlands, Canada, Germany, the USA and China were all exceeded by the South African sugar industry. Therefore, the hypothesis was rejected.

6.3 Conclusions

When all the results were considered, it was concluded that the South African sugar industry still has a chance to improve and be counted among the best traders of sugar. The sugar industry in South Africa was competitive in production and trade, there was a huge chance for South Africa to be among the top exporters. Therefore, the hypothesis formulated for the study was rejected, since the overall results proved that the industry

was competitive against its competitors. The sugar industry in South Africa was known to be among the top 15 producers of high-quality sugar, which left space for improvement in the industry. Government interventions in the local sugar industry could see gains to the South African economy through foreign exchange earnings from sugar trade. The fact that the industry not only produce sugarcane, but also sugar beet, it gave the South African sugar industry more advantage over other countries that produced a single product. Therefore, it is safe to say that the sugar industry in South Africa stood a chance to compete with the top ten international exporters efficiently. The following recommendations were made necessary for the improvement of the sugar industry in South Africa.

6.4 Recommendations

The absence of South Africa in major sugar exporting markets could be the result of lack of growth initiatives such as, export advancement and bilateral trade agreements, as well as high production and processing costs. That means there is need for South Africa to create and develop its markets, mostly in huge import markets. South Africa must expand its international competitiveness and pursue preferential market access provisions. There were export markets identified in **Table 5.12**, which South Africa could exploit to improve its export capacity.

Trade negotiations that could lessen trade barriers across countries are necessary, because they may bring about the required growth in the export of high technology goods, that lead to job creation and better wages in industries. In many developing countries including South Africa, smallholder farmer participation in agricultural markets continues

to be constrained by the absence of market information; hence, worldwide development of information and communication technology is required to create new standards to improve the capacity of the agricultural sector and rural livelihoods.

The competitiveness of South African agribusiness sector relies on several technological, socio-political and economic factors. External environment is a big influence on trade that could force policies used in the agricultural markets especially in sugar trade to be reviewed since the product is treated differently from other agricultural produce.

Agricultural technology should not only supplement more effective food production, it should address environmental protection and well suited policies that support various household livelihoods for rural development. Improved agricultural exports, particularly those of high value agricultural products and value-added commodities, are known to deliver development motivation for the South African agricultural sector.

The South African sugar industry needs to invest largely in skills and information development. Research determination in universities and colleges associated to the sugar industry, food safety and health issues, trends in consumer changes and the business environmental variations, both domestic and globally, will eventually generate information that will confidently influence the competitive advantage of the industry.

The government has a major role to play in the agricultural sector, local farmers need to be empowered with the necessary skills that will ensure that they compete effectively in the international markets. It is imperative for the government to ensure that local farmers

are boosted and protected against unfair competition. Proper technology, input and export subsidies for farmers would improve the performance levels of the industry and thus assist in ensuring that the country exports successfully without experiencing high transport costs on their exports. Protection of local farmers against dumping from the developed countries should also be of higher concern for the government, as the agricultural industry of developing countries is mostly exploited by developed nations.

Employment of sustainable strategies such as proper research and development of proper export channels for sugar farmers is vital to ensure that local farmers are up to date with the international markets performances. Robust research will assist local farmers in investigating potential markets that can be exploited and will boost the knowledge of farmers to get access to information that might be relevant to the industry to improve their chances in the sector.

Drought is amongst the major stumbling blocks for the sugarcane industry of South Africa, which resulted in a number of small-scale farmers abandoning the farming business due to losses and unaffordability of inputs. South African sugar farmers need to be trained on how to adapt to ever changing climatic conditions; the industry is dominated by small-scale farmers who are not well exposed to the international markets.

The country needs to look at how land reform and small-scale farms are fitted into the sugar industry and also consider how the industry compensates its farmers with an aim of achieving high productivity (SAFDA, 2017).

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